

THE BOOK
of
KNOWLEDGE

The
BOOK *of* KNOWLEDGE

The Children's Encyclopedia

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DEPARTMENTS

The Earth
Stories and Legends
All Countries
Golden Deeds
Helps to Learning
Literature
Animal Life
Famous Books
Dominion of Canada

The United States
Familiar Things
Our Own Life
The Fine Arts
Men and Women
Poetry and Rhymes
Plant Life
Things to Make
and Things to Do

Book of Wonder

VOLUME IX

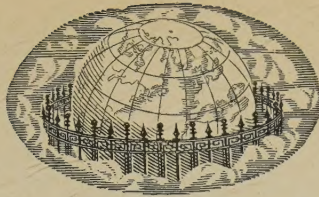
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This is a short guide to the principal contents of this volume. It is not possible to give all of the questions in The Book of Wonder, or the titles of all of the Little Verses and Problems, but in all cases the pages are given where such sections of the book begin. In the big Index, Volume 20, you will find every title and every subject, including the pictures.

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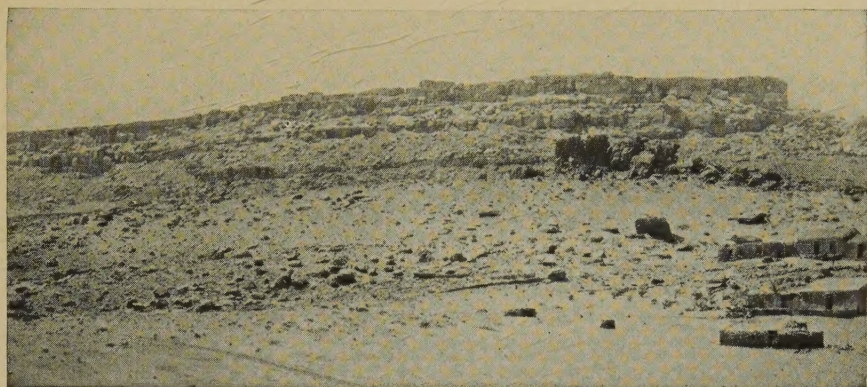
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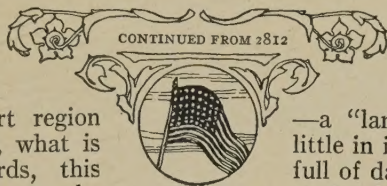


In the petrified forest with its fragments of great stone tree-trunks.

AN AMERICAN DESERT AND ITS INHABITANTS

THE call of the Wilderness—all who have been within the borders of the Painted Desert region have felt it—and yet, what is it? To the Spaniards, this region was the *arida zona*—the arid zone. To the American pioneers who first penetrated its wastes, it was a land of terror, part of the dreaded Colorado desert, which separated them from the land of promise in the West. To us, it is a place of mysterious beauty, to which, if once we have seen it, we are called back by its haunting charm.

The greater part of Arizona is very dry, for little rain falls, and the rivers have cut down so deep through the sandy soil and soft rock that they give the thirsty land no water. Yet there are some fertile valleys and forest-covered mountains. The desert herbage gives food to thousands of cattle and large flocks of sheep. Where springs of water can be reached, or irrigation works have been built, sandy wastes have been turned into fruitful fields and gardens. The whole country is full of wonderful light and color, and nowhere is the light clearer, or are the colors more brilliant than in the northern region of mesa and cañon called the Painted Desert.



At first the desert seems but a vast, dreary wilderness of barren sand and sky

—a "land of lost rivers with little in it to love." It is a land full of dangers: danger of sun-

stroke from the scorching heat of the midday sun, of chill from the sudden cool of the nights; danger of parching thirst, of fierce thunderstorms and of blinding sand-storms. Before us lie mile upon mile of inhospitable sandy wilderness and blunt, sun-scorched hills painted bright with glaring red and brown and blue, purple, yellow and white. The sky stretches above, cloudless and intensely blue; the air is filled with the glare of the sun until the landscape swims before us in waves of quivering color. Here and there the waste is broken with patches of mesquite, of creosote, of sage-brush and of huge cacti sometimes fifty feet tall; and queer, tricky ground creatures slink across the open spaces. Yonder a little bright lizard lies on the sand and pants and enjoys the sun. The painted lizard and the deadly desert rattlesnake called the side-winder because of its sidelong motion, alone of all the desert creatures seem to seek the torrid heat of the sunny places.

In the summer the heat is often 125 degrees in the shade. A piece of metal that has been lying in the sun cannot be touched by the bare hand, for it would raise blisters.

Yet the air is so dry that the heat is not often unbearable, and the nights in the open air of this healthful region are generally cool. The greatest drawback to the country is its lack of shade, and it is said that cattle will seek the shade of a tall cactus plant, or even a telegraph pole, in an effort to escape the sun's glare.

THINGS IN THE DESERT ARE NOT WHAT THEY SEEM

It is unwise for people who are strangers to the desert to attempt expeditions on foot. In the clear dry air distances are very deceptive, and people on foot wander farther than they realize and sometimes become lost in the desert for days at a time.

The land is not dead, like the Sahara, but there is little water to be found throughout this great region. The rivers have cut deep trenches through sandy soil and soft rock, and the Colorado flows at such a depth that the faintest murmur of its thunder cannot reach its lofty banks, and men have died of thirst within sight of its rushing waters, and even the railways must provide great tanks of water for their engines. Every puff of wind whirls a cloud of alkaline dust along the plain, to fill the nostrils and blind the eyes of the unwary traveler.

In the violent tornado-like sand-storms which sometimes overtake travelers in the Painted Desert people are very apt to be smothered or buried in the sand. The only hope of safety lies in tightly wrapping one's head in a blanket and keeping quite still until the storm is over. In these terrible sand-storms whole sand hills are sometimes torn out of the earth and whirled across the country. As someone said, if you would buy land in Arizona, you must see that it is safely anchored or you will wake up one morning to find that it has been transported into the next county.

THE SAND-STORMS AND THEIR DANGERS TO TRAVELERS

Quite a number of people are lost in these sand-storms each year, and their flesh becomes food for the carrion birds that are always hovering somewhere in sight of this desert land. Wherever death overtakes a man or beast these birds may

be found, slowly circling lower and lower, waiting to swoop down hungrily the first moment the breath is out of the body.

But dust-storms are not the only storms to be met with. Heavy thunder-storms are not infrequent, and the air is so clear, and the country so open, that they may be seen many miles away.

It is said that when a Navajo herdsman sees a heavy thunderstorm twenty or thirty miles away, he immediately sets out for the part of the country over which it has passed. He knows that his thirsty cattle will find pools of water there, and that the tender grass and herbs which spring up quickly in its path will give them food to eat.

THE CHANGE THAT FOLLOWS THE COMING OF THE RAINS

Though the desert takes its toll of men, it has a wild, elusive, lotus charm. The sun-scorched hills are luminous and rainbow-tinted in the morning mists; the wilderness has its bits of tender green where silver threads of springs bubble up and flow out into the desert to be gulped down by the thirsty sands. True, it is a land of arid wastes; yet a single spring shower in a night will make the "desert blossom like a rose"; and people wake to find stretches of tender grassy blades where before had been only sand; and in the grass are a multitude of blossoms, pink, pale blue, crimson and palest gold. We live a week or two in the desert which seems so fierce and relentless, and behold, the tender witchery of the land holds us fast; and when we go away, it is not of the waste we think—of the thirst, of the storms, of blinding sand and of drenching rain; but we remember the rainbow hills in the bluish morning mist, the glorious colors painted lavishly on hill and sand by Nature's master painter, the desert air after a storm has swept it clean—cool and crisp and intoxicatingly sweet—the "divinest air to be breathed anywhere in God's world." This is the call of the desert, and once it has been heard, it draws men back. Miners and cattlemen feel the charm alike, and though they leave it, cursing the land for its dryness and its heat, they all go back.

A FOREST OF SOLID STONE

In one part of the Arizona desert we come to the petrified forest, which is a part of the fascination of this strange wild land. On every side lying about us

REALMS OF COLOR AND ENCHANTMENT



Photo, Ewing Galloway.

The Enchanted Mesa (or enchanted table-land), whose summit is 430 feet above the plain, according to tradition once held an Indian village. But one day when the inhabitants were on the plains tending their crops an earthquake crushed down their rocky ladder and they could not get back to their homes.



Against the beautiful sky of the Arizona desert we see the peculiar terraced houses of a Pueblo Indian village high upon a rocky, sandy mesa. These houses are built one upon another, each story one step back from the one below, thus leaving a shelf to be used as courtyard and children's playground.



The Painted Desert, lying along the Colorado River in Arizona, displays a glory of brilliant colors in clays, sandstones and other substances. There, too, is the strange petrified forest, whose fallen logs are of semi-precious stone.

© Ewing Galloway.

are great stone trunks—pine trees of agate and of chalcedony. At our feet lie thousands of chips of amethyst, of red agate, of smoky topáz and of opal.

The story of these trees of agate and of chalcedony is but another wonder tale of the fairyland of the desert. Long, long ago—ages before man appeared on the earth—a great forest covered the plain near where these trunks now lie. Then the land on which they grew sank down; the sea rushed in and covered the forest; century after century the forest lay at the bottom of a sea which was full of mineral salts that caused the decaying logs to become petrified. Torrents and turbulent rivers rushing down to the sea carried in their waters quantities of sand, which sank to the bottom. Gradually it covered up the stony trunks and formed a heavy blanket far above their heads. After a long, long time the bottom of the sea was again heaved up, until it was raised thousands of feet above its ancient level, and became a dry plain, the Painted Desert that we know. Thousands of years again went by. The land lay in the bright sunshine as it does to-day; but the rain of summer, the cold of winter, the winds and the torrents were constantly at work. They carved out the deep valleys that we call cañons, and left the high table-lands that we call mesas. The trunks of the ancient trees were torn from the resting-place where they had lain so long, and swept by the force of torrents to the place where they were found. One of these trees still lies across a narrow cañon, and forms a wonderful natural bridge.

THE DWELLERS IN THIS DESERT LAND

The people who live in this wonderful desert are as mysterious as the land itself. Men ask whether they have come from the north or from the south, from the coast of Asia or some far Pacific island. No one can answer. Their origin remains uncertain, and their history is unknown, except through legends and traditional songs and mystic ceremonies handed down from father to son through long generations.

We travel into the desert region to visit this ancient race, whose terraced villages, built upon dry, desolate plateaus called mesas, are the same to-day as they have been for many hundreds of years. The centuries have made but little change

in this wild land and its peoples; we find that "the worn trails to the mesa summit are the same; the glaring yellow sand is the same; the red and gray rocks are the same; the glaring, pitiless sun with its infernal scorching is the same." Above, in the villages, we find naked children; lithe, active young men; young women, with their peculiar style of hair-dressing; blear-eyed old men and women; patient and stolid burros, and dim-eyed captive eagles. The quaint, terraced houses, with their peculiar ladders, grotesque chimneys, passageways and little steps, are all practically the same as they have been for centuries.

THE STRANGE PEOPLE CALLED CLIFF-DWELLERS

Long, long ago—so long that no man can remember—a race of strange people built houses among the cliffs of Arizona, New Mexico and Colorado. They are commonly known as the cave- and cliff-dwellers, but no one knows who they were nor whence they came. Ruins of their cliff houses can be seen to-day, and in Volume One on page 163 we have given a picture of some of these ruins. It is from this strange, ancient race that the Hopi Indians of the Arizona desert are descended. Although naturally peaceable, they were forced to turn their homes into fortresses, and so they chose to build upon rocky hills or mesas for purposes of protection. "With but one or two almost inaccessible trails reaching the heights, their homes were easily defensible. Their fields, gardens and hunting-grounds were in the valleys or far-away mountains, whither they could go in times of peace, but when attacked by foes, they fled up the trails, established elaborate methods of defense, and remained in their fortress homes until the danger was past. The very construction of the houses shows this. In none of the houses is there any doorway into the lowest story. 'One climbs up a ladder outside, drops through a hole in the roof, and descends the ladder inside. When attacked, the outer ladder could be drawn up.'"

The hot desert sun beats down upon us pitilessly as we toil up the steep trail that winds to the summit of one of the mesas. As we reach the head of the trail, the picturesque village of terraced houses stands before us. The terraces are built two or three stories high, each story being set back from the one below, thus giving

INDIANS OF THE DESERT



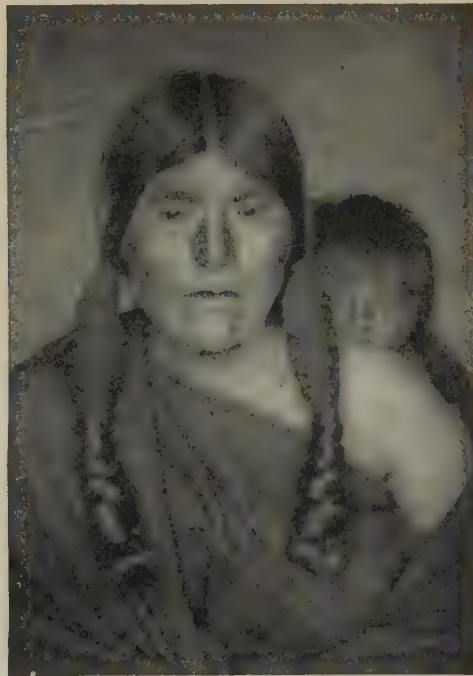
This is a young Pueblo married woman, as we see from the arrangement of her hair in two rolls, to represent the ripe fruit of the squash.



The burning sun and the struggle for existence in the desert make its inhabitants grow old early. This Hopi man in middle life looks old.



We know that this is the picture of an unmarried Pueblo girl by the way in which she arranges her hair in two whorls supposed to resemble squash blossoms. Notice her ornament of beaten silver.



The Pueblo mother carries her papoose on her back. This picture gives a good idea of the blanket robe of the Hopi woman, which folds over one shoulder, leaving the other bare.

a part of the roof of the lower story to be used as a courtyard or playground for the children.

You will be astonished to learn that the Hopi houses are owned and built by the women. Indeed, the position of a Pueblo Indian woman is very high. She owns the house and receives her husband into her home. The children take their clan name from their mother and not from their father; the "corn, melons, squash and other vegetables belong to her when once deposited in her house by her husband. She is, indeed, queen in her own home, and is on quite equal terms with her husband." Of squash, pumpkins and other crops her store is likely to be ample, for the Hopis are good farmers. They are, besides, expert makers of blankets, baskets and pottery.

THE INTERESTING CHILDREN OF THESE STRANGE PEOPLE

These brown youngsters are a very important factor in the Hopi community. When the cornfields at the foot of the mesa are ripe, the younger boys and girls scare away the birds or other marauders from the precious harvest that has been wrung with so much labor from the sandy, sun-scorched soil. And when the harvest is ready to be gathered, the little children, as well as the women, aid the men in gathering the crops, in steaming the corn in a great oven dug in the ground, and in packing the ears in sacks and blankets on the backs of the little donkeys called burros, to be carried to the corn rooms on the mesa above. All the young boys, even the little tots who can scarcely walk, use the bow and arrow with dexterity. We bribe the children to come forth from their hiding-places by showing some pennies, and then borrowing a small hard melon from one of the kindly, wrinkled Indian women, we begin a shooting match. The melon is thrown into the air and the children shoot their arrows at it to see how many they can stick in it before it reaches the ground. One small chap manages to get three arrows in the melon.

But the children are not the only interesting members of this race. The group of girls in their picturesque blanket robes and their shining black hair twisted wheel-like over each ear are a very pleasant sight to look upon. Every Pueblo Indian girl, as soon as she is of marriageable age, twists up her hair so

over her ears to symbolize the blossom of the squash. When she marries, she parts her hair and wears it in doubled-up braids, one on each side of her head, to symbolize the fully developed squash fruit.

The Hopis are wonderfully hospitable, and presently we are invited to climb up one of the ladders and to descend into the house. As we squat upon the floor, the Hopi housewife places a big basket of flat yellow cakes called "piki" before us, and signifies that we are to help ourselves. We do, and find that the little cakes are not half bad.

COOKING THE FOOD CALLED PIKI ON THE STONES

"It is fascinating in the extreme to see a woman make piki," says George Wharton James. "Dry corn-meal is mixed with coloring matter and water, and thus converted into a soft batter. A large, flat stone is so placed on stones that a fire can be kept continually burning underneath it. As soon as the slab is as hot as an iron must be to iron starched clothes, it is greased with mutton tallow. Then with fingers dipped in the batter the woman dexterously and rapidly sweeps them over the surface of the hot stone. Almost as quickly as the batter touches, it is cooked; so to cover the whole stone and yet make even and smooth piki requires skill. It looks so easy that I have known many white women (and men) tempted into trying to make it. Once while attending the Snake Dance ceremonials at Mashonganavi, a young lady member of my party was sure she could perform the operation successfully. My Hopi friend, Kuchyeampsi, gladly gave place to the white lady, and laughingly looked at me as the latter dipped her fingers into the batter, swept them over the stone, gave a suppressed exclamation of pain, tried again, and then hastily rose with three fingers well blistered."

Although the Hopi woman, who has been grinding corn in a big trough while we have been eating the piki and has been talking to us by signs, is very interesting, yet we are glad to ascend the ladder and to get once more into the open air; for the ancient Hopi houses, though picturesque, are not the most wholesome places in the world. Some of these Hopi Indians are now leaving their ancient towns to live on the plains below.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 3207.

WHERE ROMANCE AND ADVENTURE LURE



This road, badly washed out by a rainstorm, is in the Utah desert. Where flocks of sheep long grazed the land too close it now has a shifting surface. Rains pour down their drenching floods on the barren spaces, "beating all weak things into the sand" and forming lakes in the hollows. A roadway may change after each storm.



This is Skyline Drive in Colorado. Here are great buttresses and crags, "time-worn bastions" of those regions where there is "nothing small save those who enter without respect"—regions on a "scale made by giants." The Desert is always calling to possible adventure and romance—something exciting and fascinating "just around the corner."

Photos, Ewing Galloway.

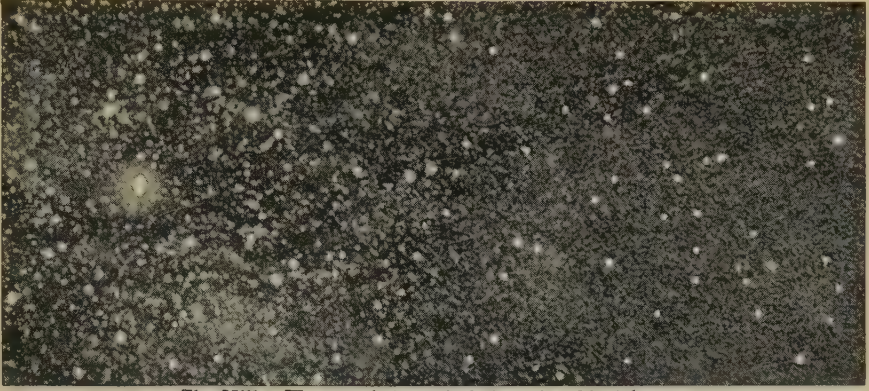
DESERT TRAILS AND ROADWAYS



The picture on the left gives a glimpse of the Rio Grande where it is crossed by a bridge on the road from Taos Junction, New Mexico, to the Taos Indian Pueblo. That on the right shows the Apache Trail between Phoenix and Globe, Arizona, a road leading into Fish Creek Canyon. © Ewing Galloway.



This road lies between Bisbee and Tombstone, through the Arizona desert. Leo Crane, in *Indians of the Enchanted Desert*, says that all wise desert travelers aim to "make a long step on the road" while the sun is high, for "the shortest distance between two points in the desert is not a straight line," so many are the obstructions and treacherous traps in the way of sand dunes, scrubby slopes and gullies. Photos, Ewing Galloway; upper left photo, copyright, Ewing Galloway.



The Milky Way as photographed through a big telescope.

THE IMMENSITY OF THE UNIVERSE

WHEN the eye looks upward on a clear night it sees, powdering the dark sky, innumerable points of light. Perhaps you already know that many of them are far greater and brighter than the orb which turns our own night into day.

As a writer of our own time has said, these stars set before man the double character of his nature and fate. He is himself but a tiny creature on the great earth on which he lives; and the earth is but a pellet in the huge system of the sun, which in its turn is less than a speck of dust traveling in the immeasurable void of space.

Yet the mind of man is able to grasp these immensities and set them in their proper order. Light comes from the stars to fall on man's eye; his mind has grasped what that light has to tell him of the distances it has come on its way to the earth.

The distances are so great that the eye and the mind are the only things by which they can be measured. If we wish to gain any clear idea of them we can do so only by comparing them with two things that are associated with the human eye and the human mind—the speed of light and the speed of thought.

The speed of thought may have

CONTINUED FROM 2928



more than one meaning. Here we use it as meaning the rapidity with

which it can transfer itself without pause or interval from the present to the past, or from the earth on which we live to

the farthest planet of the sun, or to the stars that fringe the Milky Way.

But the speed with which light travels to the eye from the sun or a star is a more exact thing. So far as the mind of man has been able to discover, it is a fixed and unchanging thing. It forms the only measure by which the dimensions of the universe of stars can be reckoned, and is the only unit which gives any clear idea of the size or the shape or the arrangement of that stellar universe.

Nearly everyone is familiar with some illustration which seeks to show how far the sun is from the earth by estimating the time it would take an express train to make the journey. The fastest train which leaves your station each morning would, if it could continue at full speed to the sun, take more than 175 years to get there.

That is perhaps not in itself a very helpful statement because 175 years in the future does not convey much to the mind; but if you can imagine the same train traveling backward through time, think of the events which would have had time to take place.

**THE TIME IT WOULD TAKE A TRAIN
TO REACH WORLDS IN SPACE.**

If the train were able to make a further excursion and go on past the sun to pick up the planet Jupiter on the farther side, its journey would be prolonged for another 900 years. In that 900 years everything that has happened since the Norman Conquest could be transacted, all the wars and all the inventions. If the train's journey were still farther extended to Saturn (1,633 years), or to Uranus (3,400 years), it would occupy periods of time which in the world's history comprise not merely the reigns of kings and queens, but the birth and decay of nations.

Finally, before the express reached the outermost planet of which there is positive knowledge, the planet Neptune, the journey would have occupied 5,250 years. This is an era in which it would be possible to include nearly all that is written of the civilized world's history. It would easily take in the birth of Abraham and the exodus into Palestine.

These illustrations may convey some idea of the insignificance in size of the earth when compared with the domain of the sun and its obedient planets. But they begin to fail when we try to realize the proportion and relation of this solar system to the star-filled space which the humblest mortal on the earth can see. Probably three hundred million stars can be seen through the greater telescopes, but the most wonderful, and indeed terrifying, thing about the space of which they are the tenants is its emptiness. Every star seems to be remote.

**THE JOURNEY TO THE SUN'S
NEAREST NEIGHBOR**

If that express train which has been used to give an idea of the distances of the sun and its planets were to be sent on to the star which is the sun's nearest neighbor, Alpha Centauri, the journey's end would not be reached for fifty million years. That figure does not mean very much because there is nothing in our knowledge of time, even of the geological periods, with which to compare it.

Nor are we much better off if we imagine the distance to be covered by the swiftest projectile ever hurled by the guns of the World War at a speed, let us say, of 2,200 feet a second. Such a projectile would require a million and a half years to reach the nearest star. Even that vast projectile, the sun itself, which is

hurtling through the thinly sown field of stars at a rate of from eleven to twelve miles a second, would, if going that way and the star were standing still, reach it only after some 75,000 years.

Yet there is a measure which can be applied that will bring these distances within reach of comparison. It is the speed at which light travels. Light eats up the miles. It travels a million miles in five and a half seconds. On the wings of light we should reach the sun in something between eight and nine minutes; we should be on Uranus before ten thousand seconds had elapsed—which is not very much—and could reach the uttermost limits of the solar system in a few hours.

But if on this magic vehicle we sought the nearest star, the journey through black emptiness would not be finished for four years and four months. The star is twenty-five million million miles away. Our solar system, which seems so great compared with the earth, is very tiny when measured by the stars. A boat in the midst of the earth's greatest ocean is not more utterly alone.

**THE INFLUENCES THAT BIND THE SUN
AND EARTH ACROSS SPACE**

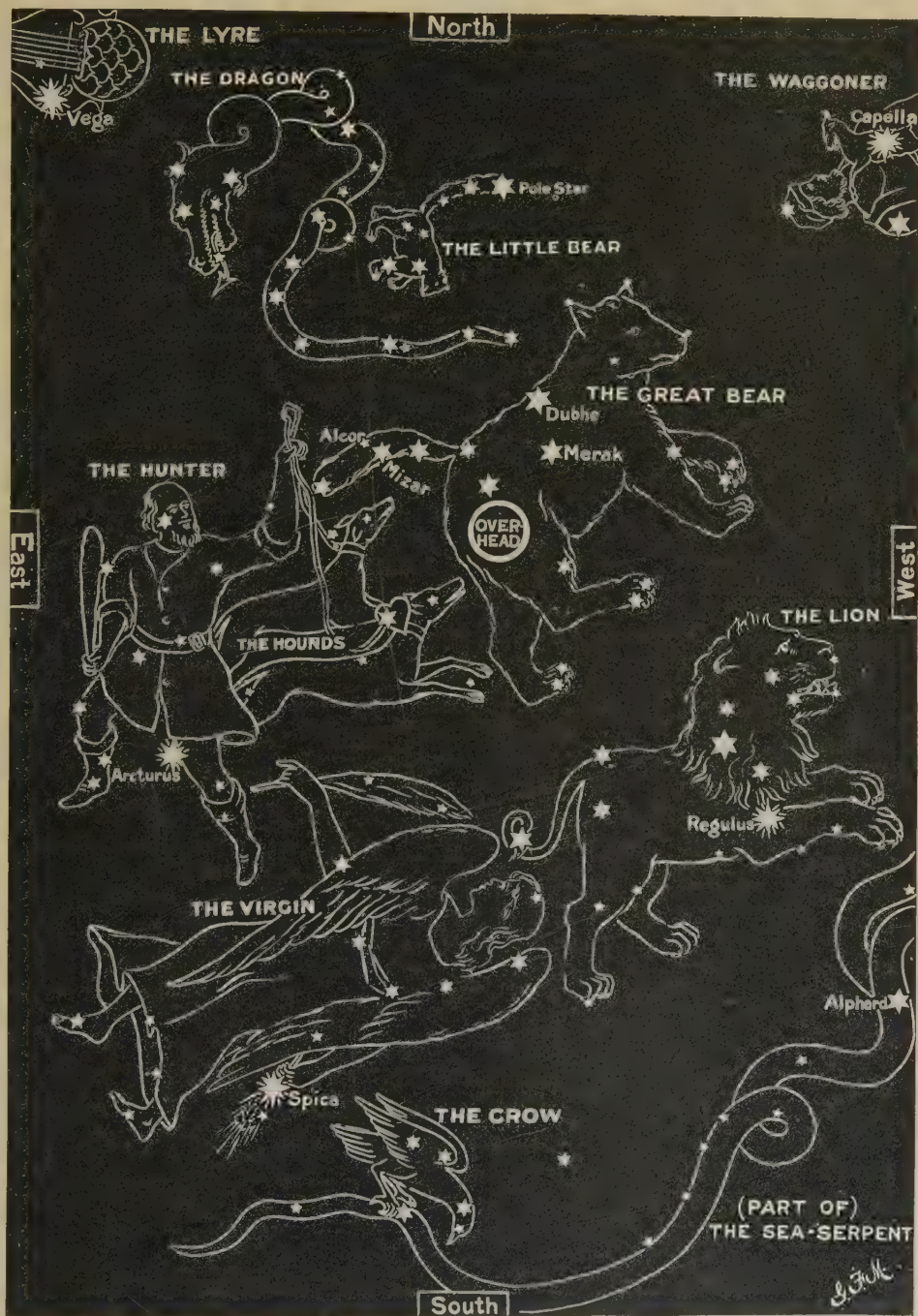
By using our power of reasoning and our power of observation we can understand some things. Though the stars are very far apart, they seem to be bound together in some sort of relationship. Every star, even the tiniest, and the earth and the sun are bound together by influences which are felt across the wide distances. We may not be able to measure this influence, but it exists.

We must bear this in mind when we come to consider the further depths of space that we try to measure by means of the speed of light. The distances of these stars is so great, and their movements are so hard to see, that there are not more than seventy of which we can confidently tell the distance.

The distance of some of the brightest stars in the heavens is yet unknown. On the other hand, some of them, after years of patient inquiry, have yielded up their secrets. Thus of the brighter stars we have confidence in saying that Sirius, that brightest star of all, is at such a distance that the light it sends to the earth takes about 8 years and 9 months to reach us. Altair is 14 years of light-travel away; Aldebaran 30 years away.

THE GREAT GROUPS OF STARS

We give in these pages the groups of stars to which in ancient times people gave the curious names that have become familiar; and our artist has drawn outlines to suggest how their imagination worked in naming these star-groups, or constellations, as we call them, because they appear to cluster together.



THE MAP OF THE STARS IN SPRING

It is difficult for us to see any resemblance in these star-groups to the creatures after which they are named. Perhaps the positions have changed, but there seems to be little reason to believe this.

THE MAP OF THE STARS IN SUMMER



The grouping of the stars into constellations supposed to represent animals and other things has been continued by modern astronomers because it has proved convenient for so long, and any change would cause confusion. One of the names, the Plow, is a good and useful one, because the seven bright stars that form the tail and back of the Great Bear, as seen in this picture, really have the shape of a plow. The Great Bear is the most easily seen, and two of its stars point almost in a straight line to the Pole Star.

THE MAP OF THE STARS IN AUTUMN



The zodiac is the belt in the heavens within which the sun and the principal planets move. The best known of all the constellations are those which lie within the zodiac. They are twelve in number: the Ram, the Bull, the Heavenly Twins, the Crab, the Lion, the Virgin, the Scales, the Scorpion, the Archer, the Goat, the Water Carrier and the Fishes. We can see all the constellations of the zodiac in these four star-maps, and can then find them in the sky. These names were given at least 2,500 years ago. The Ram and the Archer were the first two constellations to be marked out and named.

THE MAP OF THE STARS IN WINTER



The two earliest Greek writers whose works have come down to us refer to constellations by the same names we give them. They speak of the Bear or the Wagon, part of which is also known to us as the Plow; of Orion, whose belt of three bright stars we know so well; of the Dog of Orion, with its starry nose formed by Sirius; and of the Pleiades. All these are shown here. The Bible also refers to stars and constellations which have been identified as the Pleiades, Orion, Arcturus, and the twelve signs of the zodiac. We can read of these by name in the Book of Job.

Arcturus and Betelgeuse are plunged in a profundity of space so remote from us that light from them is traveling 126 years before it reaches the earth. Canopus, the great star of the Nile, bright as it shines, is so far away that the distance cannot be measured. It can only be arrived at by reasoning, which takes into account both its brightness and the impossibility of applying any astronomical method of measurement to its never-altering place in the skies.

By such computation it is known that it must be at least 300 light-years away—a light-year being the distance light travels in a year, at 186,000 miles a second. Consider that distance for a moment, applying it to the methods of illustration that were used when we pictured the railway train traveling backward through time. When the light that falls on your eyes to-night left Canopus, the English were just beginning to settle America at Jamestown and at Plymouth.

So far we have been speaking of measures of space which are, by astronomical reckoning, certain and assured. They have been examined by patient and ex-

acting minds for many years and have stood the test. But it is equally certain that these bright objects of the skies are not the most distant. There are mists and clouds of stars far beyond them, and

we know that they must be far more distant because, if for no other reason, they are so much less bright.

Canopus is perhaps 22,000 times as bright as the sun. There must be other stars in the firmament as bright or brighter. They do not seem so because they are more distant; and it is in some such way as this that their remoteness is estimated. If, traveling like light among the stars, we scoured the heavens we should encounter, at intervals of years between, systems and suns very unlike our own.

Even that nearest neighbor, Alpha Centauri, would be very different, for it is in reality two suns. There would be other suns in pairs; and suns in threes; and huge suns

that could swallow the sun and its nearer planets with ease; and great masses of gas like the nebula in Orion, in which the solar system would be lost. The number of suns is enormous.



The little dot we live on—the earth as a speck in the universe.

A WONDERFUL REGION OF HUNDREDS OR THOUSANDS OF SUNS

We should find ourselves in a great region of hundreds or thousands of suns, separated by many years of light-travel each from each, but all traveling in company. This company is called a globular cluster of stars because it looked, in the older telescopes of last century, like a little fuzzy ball of stars. It was only when the big new telescopes of America and Europe were turned on a cluster like this that it was seen that the ball contained great numbers of suns which, like other suns and stars, were of different kinds.

Among these different suns is a particular kind of changeful one, a variable, which is exactly like a sun that is near enough for us to estimate its distance. The variable sun in the distant cluster is like the near variable sun in everything but the amount of brightness it sends to us. By estimating this brightness a comparison could be made between its distance and the distance of the variable sun which is near enough to us to have its distance measured. This is the way in which, in the last few years, a new idea was gained of the more immense distances of space.

THE TIME-JOURNEY LONG ENOUGH TO HOLD ALL HUMAN HISTORY

Before that time it was believed that the misty scarf of stars which we see in northern climes on clear nights, called the Milky Way, set the boundaries of the universe of stars. Many estimates had been framed of the distance from which they shone upon us. The best authority, Professor Simon Newcomb, came to the conclusion that the Milky Way in most of its parts was no nearer to us than would correspond to a light-journey of 3,200 years. The new inquiries and examination of the clusters of stars put the boundaries farther back than that by far. They put the distances of some of the clusters that are well known and have often been examined at 20,000, or even 45,000, light-years. Some clusters that are fainter are placed at more than 100,000 light-years; and the farthest star of all may be as much as 220,000 years of a light-journey away from the earth.

Even with every aid of the imagination that distance is hard indeed to realize, for within that huge gap of years the whole history of mankind could be taken

in. We could begin with man's early life in forest and jungle and continue with his struggles when, perhaps through some accident in the sun's own journey through space, he had to battle with the Ice Age.

Even so, speculation as to the vastness of the outermost limits of the universe of stars is not exhausted. Among the wondrous objects in the heavens that the light ray discovers in its journey are the so-called spiral nebulae. No instrument of astronomy, no ingenious computation has yet certainly made out how distant these are. Some believe them to lie outside the Milky Way and all the ordered regularities of the stellar system, and picture our universe of stars as speeding forward like a ship through the ocean of space with the globular clusters of stars coming in to join it, and the spiral nebulae speeding away from the prow.

Some astronomers think that these spiral nebulae are universes themselves and that perhaps our own universe is simply one of many spiral nebulae. They do not say that this is a fact, for they do not know. A real scientist does not hesitate to say that he does not know. Only fools pretend to know everything. Ignorance is not in itself a fault, but not wishing to know the truth is an everlasting disgrace.

THE TRUTH ITSELF AND THE UNENDING SEARCH FOR TRUTH

It may be so; these outer systems, if outer systems of stars they be, must yet be joined with the universe as we see it and know it. Of that universe we can say, with a fine writer, Miss Agnes Clerke, that the scale of its construction strikes imagination impotent; in the splendor of its parts, in the number and variety of the groups constituted by them, in the magnificent play of forces it unfolds, it bears glorious witness to the power of the Almighty Designer.

It has its limits, though they be set as far apart as is the east from the west, and for that reason is a fit subject for our limited understanding. Its problems and limits we may never solve completely, but we may remember the words quoted by the astronomer Kapteyn:

If God held in his right hand all truth and in His left nothing but His ever ardent desire for truth, even with the condition that I should err forever, and bade me choose, I would bow down to his left, saying, "O Father, give me that: pure truth can be but for thee alone."

THE NEXT STORY OF THE EARTH IS ON PAGE 3171.

The Book of Familiar Things



A great pin factory.

THE STORY OF A COMMON PIN

ALTHOUGH pins have been used since the very earliest times, we cannot tell you very much about their history, because they have always been such very common things that no one has thought very much about them, and they have not been large enough to escape destruction. Nevertheless, what we do know about their story is very interesting, and to find its beginning we have had to go back and read the unwritten book found in the relics left by primitive man.

When the growing cold of the Glacial Period made it necessary for man to cover himself with warm clothing, he had to find something to fasten together the skins with which he clad himself, and he found a sharp thorn! If you take a common brass pin out of your pincushion you will see that it still keeps the shape which our primitive forefathers found of so much use. Until quite lately the gipsies continued to use thorns, boiled in oil to harden them, as pins. Some of the North American Indians used thorns of the honey-locust for the same purpose, and the Egyptian peasant women of our own time use thorn pins.

Our cave-dwelling ancestors knew of no way of hardening their thorn pins, which were not very durable,

CONTINUED FROM 2920

but some cave genius thought of using a splinter of bone, and this new fashion spread. At first the bone pins were very roughly made from the leg-bones of small animals, and show the joint which was left at the top for a head, but by and by they were smoothed and polished. Some of the artists of the late Stone Age were able to make quite beautiful pins with well-carved heads and smooth, polished points.

When bronze was invented, and the Bronze Age began, it was found that better and smaller pins could be made from the new material. But very large pins were also made, and the flowing robes of the Greek women seem at one time to have been fastened together by them. The story runs that one lone man who escaped from a battle was put to death by the women of Athens, who stabbed him again and again with their long dress pins. After that, the story says, they were compelled by law to sew their robes and were not permitted to use pins. The Romans of the Iron Age used ivory pins and bronze pins. Gold pins were also used by them, and some of their bronze pins were small and fine. Probably silver pins were also used. Fine pins made of this metal were found in the tombs of the Peru-

vians, who were in the Bronze Age when they were discovered by the Spaniards.

It is impossible to say when the first wire pins were made. We know that they were made in England in the fifteenth century, for in 1483 a law was passed forbidding their importation. Nevertheless, in spite of this prohibition, most of the pins used in England were brought from France and Germany, where brass pins were made as early as the sixteenth century. It is said that pins of brass wire were first brought to England for Katherine Howard, the unhappy wife of Henry VIII. In the seventeenth century, however, John Tilsby set up an establishment for the making of brass pins at Stroud, in Gloucestershire. Not long after, their manufacture was begun in the cities of Bristol and Birmingham, and English pins became noted for their excellence.

Pins were imported to the American colonies from England, and no attempt was made to manufacture them on this continent until after the Revolution. In 1775 a prize was offered by Congress for the first twenty-five dozen pins made in America equal to those of English manufacture, but the records do not show that the prize was claimed, and the first pin-making establishment in the United States does not seem to have been started until the year 1812. This does not seem to have been very successful, but in 1836 the Howe Company was organized.

Until the nineteenth century pins were made largely by hand. The making of the head was a separate process, and was performed by twisting spirals of wire around a spit and cutting them into lengths of two spirals each. Each shank was then thrust into a spiral, and the two were clamped tight together by a die. This was a very slow process, but in 1824 an American named Lemuel W. Wright invented a machine to make pins in which a solid head was formed in one piece with the shank. He took out a patent for this machine in England, and solid-headed pins were first made there. More than twenty-five years earlier Timothy Harris, an Englishman, had attempted to make solid-headed pins by molding the heads.

A short time afterward Dr. John Ireland Howe, a New York physician, invented a machine which made more perfect solid-headed pins, and it was this

machine that was used by the Howe Company, which opened an establishment at Derby, Connecticut.

At that time as many as fourteen operations were needed to make a pin. Much time was used in its manufacture, and the labor of many men was needed. But a few years later Samuel Slocum invented a machine to stick the pins into the paper which holds them. This time-saving device succeeded, and since that time other inventions have been made which have proved so useful that, as you may see from the pictures, pins are made almost entirely by machinery.

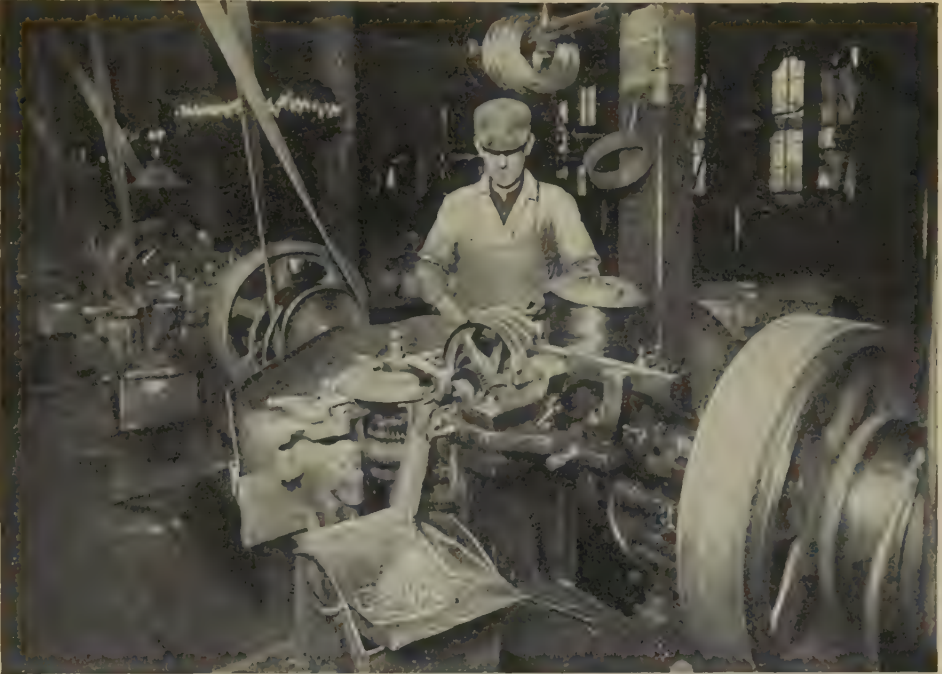
They are made from steel, from brass and iron wire. The very cheapest kind that you can buy, for a few cents a paper, are made from iron wire; the pins that we ordinarily use are made from brass wire; and the best pins are made from hard steel. Black pins are made from iron wire, given a bath in black japan and dried, while pins for ordinary use are coated with tin to keep them from rusting. The colored glass heads, which are put on many fine steel pins, are made from molten glass. Until quite lately, nearly all these pretty pins came to us from Aix-la-Chapelle, in Germany.

Of course, when pins were made solely by hand they were quite expensive. Ladies were given a special allowance called "pin money" in the days when very elaborate headdresses required dozens of pins to fasten them, and the term is still used for dress money. Many proverbs were made about pins, such as "He that would steal a pin would steal a greater thing." "See a pin and let it lie, then in want you'll come to die," all of which referred, of course, to the cost of these small useful things.

Curious superstitions, of which no one can tell the origin, clung about pins. It was firmly believed, not so very long ago, that sticking pins in a wax image would cause the person in whose likeness the image was made to feel intense pain. Later still, people threw pins into wells, in the superstitious belief that doing so would bring them good luck, and there were other superstitions of the same nature which are interesting to students of old manners and customs. You see, after all, there is something of interest to be said about even so small an object as our useful common pin.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 3157.

MAKING AND PLATING PINS



This machine does nearly all the work of making a pin. The wire is wound on the reel near the left hand of the operator and is drawn into the machine, which cuts it into proper lengths. A little hammer springs forward and makes the heads, and then the pins are sharpened. They fall into the pan at the rate of from 200 to 400 a minute. Then they go to the cleaning room.

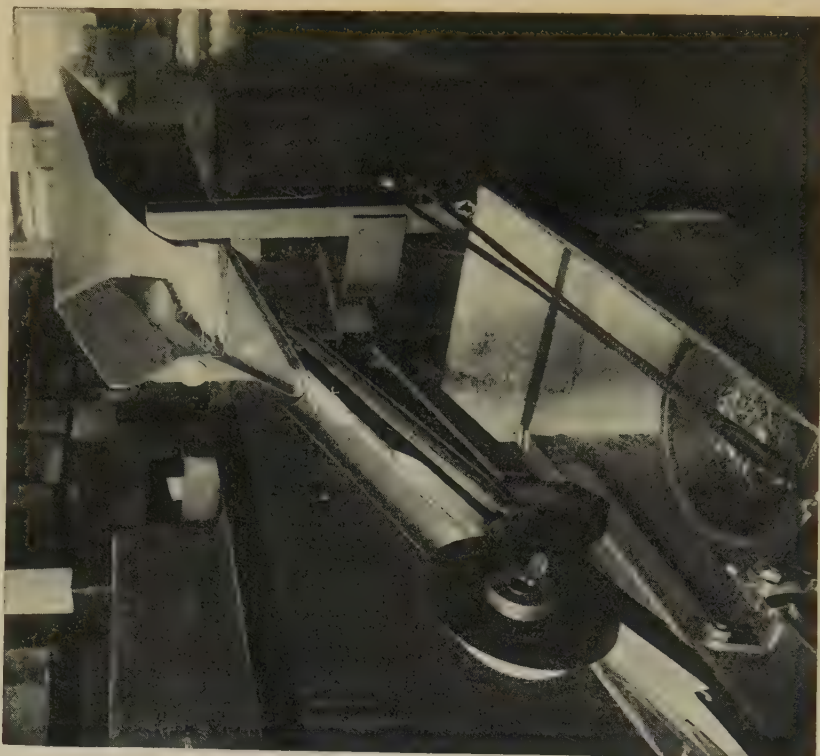


After being cleaned the pins are coated with tin to prevent them from rusting. They are boiled in a copper vessel containing a chemical solution together with plates of tin, which look something like quarters of a pie full of holes. They are made like this in order that as much surface as possible shall be exposed to the action of the solution.

POLISHING THE PINS AND ARRANGING THEM IN ORDER



There is nothing better for polishing than some kinds of sawdust. Bushels of pins are dumped into this great tub and shaken violently. The sawdust is then blown away and the beautiful bright pins are left with heads and points in every direction. They must be arranged so that all the points are one way, for a prickly heap of pins is unpleasant to use, as you may happen to know.



A scoopful of pins is poured into the hopper, which vibrates gently. In the trough is a narrow slot not quite large enough to let the head through. The body slips through, however, and the points hang down in a line. You can see the heads as they slide down the slot in a continuous stream. In the next picture we shall see what happens to them.

PREPARING PINS FOR THE SHOP



Here is the other part of the last machine you saw. As the pins come down the slot, in order, they are pushed in a regular line through a strip of folded paper. The girl on the left takes the proper length of this paper full of pins and winds it into a tight roll. The girl on the right then slips this roll into the small wooden case ready for your father's desk.



Most pins, however, are sold in flat paper packages. The pins come down, in the same way as above, to this machine, into which paper is fed. The machine crimps the paper, pushes a row through several times, and keeps on repeating the operation. Proper lengths of this paper are then folded and we have the pins you know best.

All pictures of pin-making copyright by Brown Bros.

THE BEAUTY OF RIVER AND GORGE



A peaceful scene on the river Vaal.



The rocky heights of the gorge in the Drakensberg Mountains



Uganda postmen bringing in the mails.

THE BRITISH EMPIRE IN AFRICA

WHEN we come to read the history of Africa we realize again the meaning of the term "dark continent." Except for the Lower Nile regions and the places where Rome had her colonies, little is known of early Africa. The Negroes and the Bushmen kept no records; they lived for the moment, and their memory was very short. The absence in the interior of Africa of any real barriers, such as great mountains, allowed tribes to move about freely, so that customs and beliefs became mixed. Outside of the Europeans who have found a home in the various parts of Africa (and about whom we shall speak later), and the Asiatics introduced by them, the chief peoples of Africa are the Bushmen, the Negroes, the Hamites (Egyptians), Berbers and Arabs. Then there are various mixed races, resulting from the intermarriage of these. The Bushmen, who are short yellowish brown hunters, lived on the borders of the Kalahari Desert, and formerly shared the whole of Cape Colony with the Hottentots, a mixed race of a yellowish brown complexion. Practically all of Africa, from the southern edge of the Sahara to the Cape, except for Abyssinia and Somaliland, is peopled by Negroes. The Berbers live north of the Sahara in

CONTINUED FROM 2942



Algeria and Morocco. The Arabs are scattered across all the north of Africa; in Egypt the people are Hamites; and in Abyssinia and Somaliland they are mixed Hamite and Arab.

Of all these peoples the Arabs were the last to come. Spreading in a great wave of Mohammedan conquest from Arabia through Egypt and North Africa in the seventh century, they then crossed the narrow straits of Gibraltar and took Spain. The Arab was used to obeying the chief of his tribe; he was a good trader, and could build and fashion beautiful things. But he brought with him a sad and lowering practice into Africa—that of slavery. It satisfied his love of pomp to have a bodyguard, and relieved him from drudging toil under a hot sun.

The age of discovery in the fifteenth and sixteenth centuries brought the white man to Africa. If he had not come, the Arabs and the Turks (another Mohammedan people who had overrun southeastern Europe and conquered Egypt) would have gained entire control over the millions of blacks in Africa. As it turned out, the brown Arabs and white Europeans had a long competition for the religious and political control of the Negro. The Arabs were defeated in Spain in 1492, and the Turks in southeastern Europe at

the end of the seventeenth century, just before the European appeared on the scene in Africa.

THE FIRST EUROPEANS IN AFRICA

The Portuguese were the first Europeans to *discover* South Africa. Bartholomew Diaz sailed round the Cape of Good Hope in 1488, the year that Columbus sent his brother to England to ask for aid from Henry VII; and in 1497, the year that John Cabot discovered Newfoundland, Vasco da Gama sailed into Table Bay.

But the Dutch were the first who really attempted to make a *settlement* in South Africa. Some sailors, who had been wrecked in Table Bay and afterward rescued, brought home so glowing a report of the land behind the great Table Mountain that the Dutch East India Company thought it would be a good plan for their ships to stop there and so break the long voyage to and from the East Indies. They found that inland of the Cape were fine pastures and a pleasant climate, as the land gained in elevation to the north and as the warm sun became modified. Gradually the little Dutch settlement grew larger, and about a hundred and twenty-five years later it was joined by a few hundred French Huguenots.

When the Napoleonic Wars broke out, Holland, as we learn on page 5564, fell under the rule of the conqueror. As England was at war with Napoleon, the British ships thereupon proceeded to attack Cape Town and to take possession of it. But they did it in the name of the Prince of Orange, as the ruler of Holland was then called, and when peace was made the colony was given back to Holland. A few years after, war broke out again, but this time Holland was on the side of France. The colony was once more taken by the British. This time they kept it, but paid Holland a large sum of money just as the United States paid for the Philippine Islands after the Spanish-American War. At that time the Cape of Good Hope had not half so great an area as the province has now, and there were only 27,000 white people scattered through it.

HOW THE TRANSVAAL AND ORANGE FREE STATE WERE FOUNDED

Many of the Boers, which meant originally "husbandmen," did not like the

change of rule, and when, about twenty years later, slavery was abolished in all British possessions, they liked it still less. They believed they had the right to keep the natives in slavery; and as most of the Boers were farmers who had large herds of cattle, they did not see how they could do without their Hottentot slaves. They felt, too, that the sums of money allowed to them for freeing the slaves were not sufficient. Besides all this, their treatment of the natives, especially of the Kafirs, who fought against them and stole their cattle, was harsh, and they did not like the rules that were made to compel them to be more kindly. Because of all these grievances some of the Boers again began to trek, and, in all, about four thousand left Cape Colony with their wives and children, their flocks and herds. Some of them stopped in the country beyond the Orange River, and others went on until they crossed the Vaal River. Such were the beginnings of the Orange Free State and the Transvaal.

When the Matabele, who were great warriors and had conquered that country, attacked them, they defeated them; and the Matabele fled, leaving the Boers to form their two republics in peace. Afterward these two Boer republics came to be called the Orange Free State and the Transvaal. The going-away of these Boers out of Cape Colony is known as the Great Trek, from the Dutch word *trekken*, to draw.

The second British colony, Natal, was founded partly because of the Great Trek. In those days most of that part of the country was ruled over by a Zulu king called Dingan. The Zulus, like the Matabele, were great warriors, who conquered the more peaceful tribes and forced them to do their bidding. But when the Boers had gone up into their new lands, they still wanted to be able to reach the sea, so some of them crossed the Drakensberg Mountains and sent a few of their number to ask Dingan to permit them to settle in his country.

HOW THE BOERS WERE BETRAYED AND HOW THEY TRIUMPHED

Dingan received them in a friendly way, but just as the envoys were leaving he had them murdered, and then sent off his warriors to destroy the rest of the Boers who had crossed the Drakensberg. Most of the Boers received warning in time and made what is called a *laager* by

"THE SMOKE THAT TALKS"



Bridge across the Orange River at Aliwal North.



Mont aux Sources, Basutoland, the highest peak in the Drakensberg Mountains.



The main fall and the gorge at Victoria Falls, on the Zambesi River.

drawing their wagons together round their camps so that they could shoot from behind them. Many of them were killed, but reinforcements reached them, and when the main body of Zulus came on, the Boers won a great victory, which is remembered as "Dingan's Day." After that the Zulus had a new king named Panda, who was more friendly. When the Boers had settled themselves, they began to ill-treat some of the Kafir tribes. Then the Government at Cape Colony said that, after all, the Boers were British subjects, though they were not living in British territory, and they could not object to the British setting up their own government in Natal—which they proceeded to do. But the Boers did not want to be under British government; some of them went back over the Drakensberg, and Natal gradually became more and more British in character.

Now the Boers in the Orange River Colony and in the Transvaal were coming into contact with brave and warlike Kafir tribes who not only refused to become slaves but raided the Boer farms and frequently made war on them. The danger from such neighbors as this brought the British and Boers into alliance in self-defense, and finally an agreement was made by which the Boers in the Transvaal acknowledged the sovereignty of the British crown. When the danger was over, however, and the power of the Kafir tribes broken, the Boers rose again to throw off British control. They won a victory over the British at Majuba Hill. Then there were so many people in England who said that, after all, the Boers were in the right, and had done exactly as they would have done in their place, that the British gave them back the Transvaal and allowed them to establish their republic again; but they did not make the Boers see that this was done because they thought it was just, and the Boers grew to think that it was done because the British were defeated and were afraid; and later on very great trouble came out of that.

THE CAUSES OF THE BOER WAR 1899 1902

Gold-mines were found in the Transvaal, and a great many British subjects went there to get gold out of the mines. But the President, Paul Kruger, said that these "Uitlanders," as they were called, must pay heavy taxes, and the Uitlanders

said that if they did, they ought to have a share in the government, which the Boers would not allow them. And as President Kruger was using the money he received to buy guns and instruments of war, people really began to think that he intended to make the Boers masters of all South Africa. So a great war arose in 1899 and went on for nearly three years.

At the end of the war each side had realized the good points of the other side, and felt that South Africa would get on best if the British and Dutch races worked together as friends. So the British colonies of Cape Colony and Natal joined with the Dutch provinces of the Orange Free State and the Transvaal to form a single free nation, the Union of South Africa, as one of the overseas dominions of the British Empire.

During the World War South Africa took her share of the defense of the Empire; a Boer general completed, with South African and British troops, the conquest of German East Africa, now called Tanganyika Territory; and German Southwest Africa was added as a protectorate to the territory of the South African Union.

The seat of government for South Africa is Pretoria in the Transvaal; but the Legislature meets at Cape Town. A Governor-General represents the king, and parliament consists of a Senate of 40 members and a House of Assembly of 134 members. Both the English and the Dutch languages are official, spoken in Parliament and taught in the schools.

PHYSICAL FEATURES AND PRODUCTS OF THE UNION OF SOUTH AFRICA

The most striking feature of South Africa is the rise from the sea northward by steps or terraces to a lofty plateau which forms the far interior of the country. Starting from the coastal plain, one ascends to a mountain range which, being climbed, is found to be flat-topped and to stretch away in another loftier plain. Beyond, still another mountain range leads to a second higher plain, bounded by a third range and a third plain. The last and highest mountain range which climbs to the third far-stretching plateau is about 120 miles from the coast. It is this generally lofty elevation that gives South Africa its clear and healthy climate.

The lower parts approaching the sea

MONUMENT TO A GREAT PIONEER



The Rhodes Memorial at Rondebosch.



Groot Schuur, Rondebosch, left by Cecil Rhodes as the prime minister's residence.



The cottage at Muizenburg, Cape Town, where Cecil Rhodes died.



The simple grave of Cecil Rhodes in the Matoppo Hills.

Photos, the Union Government, the British South Africa Company, Sudan Government Railway, Pilkington, Sowton.

are rich in vegetation and gorgeous with flowers. Nearly all kinds of fruits will grow, though native fruits are few. Maize, wheat, oats, barley, potatoes, cotton and tobacco grow abundantly in suitable places; but the wealth of South Africa, apart from its mining products—gold, diamonds and coal—is in its grazing lands. The grasses of its plains, though coarse and brown, rear vast numbers of cattle, sheep and horses, mules and donkeys, while its average wool clip exceeds the average value of its diamonds. A special product is ostrich feathers, of which more than two million dollars' worth are exported every year. Diamonds are mined at Kimberley by the De Beers firm, with which Cecil Rhodes was formerly associated. In the Transvaal the Witwatersrand, commonly called The Rand, is the greatest gold-producing region in the world. The average value of the gold recovered from its rocks every year is \$175,000,000.

Stretching along the western side of the Union is the former German colony of Southwest Africa, which after the World War was given to the Union of South Africa to govern. This country is sparsely inhabited by wandering tribes of natives called Hereros, who pasture their animals on the rare fertile stretches. Most of the country is a desert, with little or no rain. The coastal stretch has great sand ridges piled up by the south-westerly winds. Fogs are frequent and are caused by a cold current from the south. The capital is Windhoek.

B RITISH EMPIRE OUTSIDE THE UNION OF SOUTH AFRICA

We have now glanced at the region which is governed by the Parliament of the Union of South Africa. Then there are wide areas bordering on the Union that are under British protection, and are controlled from the South African High Commission which is headed by the Governor-General of the Union. Immediately to the north of the Union are three protectorates in which Great Britain sees that the native races have fair play. They are Basutoland, Swaziland and Bechuanaland. Tribal chiefs under a supreme chief do the ruling. Native customs exist, so long as they do not conflict with justice, but magistrates' courts decide disputes between Europeans and natives. The Basutos are skillful herdsmen and rear a special breed of

horses. Swaziland has excellent grazing grounds. The Bechuanaland Protectorate is a land of deserts with fertile patches used entirely for pasturing.

The district of Rhodesia, divided into Northern and Southern, fills a large part of Central Africa between the Transvaal and Lake Tanganyika. It was claimed by Cecil Rhodes as land suitable for colonization. He was its pioneer, and he chose there to have his grave. Rhodesia is high enough to be a white man's country. Bulawayo stands more than 4,000 feet above sea-level, and Salisbury is 4,850 feet high. This lofty land is now visited freely for its scenery, which includes the greatest waterfall in the world, where the mighty Zambezi River suddenly plunges with a voice like thunder into a chasm more than twice as deep as Niagara Falls. The natives call it "the smoke that sounds." This great spectacle was first seen by Dr. Livingstone.

Rhodesia, besides being a grazing country and producing maize, cotton, tobacco and fruits, is rich in mineral wealth. In twenty years it exported two hundred and fifty million dollars' worth of gold, and now its yearly output is fifteen millions. It produces, as well, copper, lead, silver, coal and asbestos.

Developed by the British South African Company between 1889 and 1923, it was then purchased by the British Government, but the company still retained its mineral rights. The railway from Cape Town has been extended through the whole country to Belgian Congo, which bounds it on the north. An eastward branch from Salisbury reaches the coast at Beira through Portuguese territory.

NYASALAND, THE TERRITORY OF TANGANYIKA AND KENYA COLONY

If you look on your map at the eastern boundary of Rhodesia you will see a territory called Nyasaland, which stretches along one shore of Lake Nyasa. This country is a protectorate of Great Britain. Here Livingstone and Moffat, of whom you read on page 468, did their work. Zomba is the seat of government, but Blantyre the chief town. Nyasaland has railway connection with the river ports of the lower Zambezi, and there are steamers on the lake. The climate is suited for tropical farming, and cotton and tobacco are successfully grown.

Next we look at a place on our map with a long queer name, the Territory

SCENES FROM CITIES OF THE UNION



Cape Town as seen from Table Bay.



A street in Durban.



The Town Hall, Johannesburg.



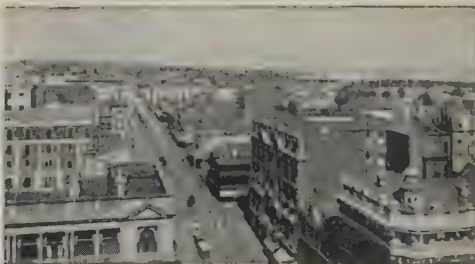
Joubert Park, Johannesburg.



The Castle, Cape Town.



Church Square, Pretoria.



Johannesburg.

of Tanganyika. Before the World War this was a part of German East Africa. The other part was added to Belgian Congo. Tanganyika is a mountainous land and includes the lofty Kilimanjaro, over 19,000 feet high. Parts of it are well forested. The lower lands are unhealthy and malarial. The people are of Bantu origin and very brave. At present the country produces copper, cotton, sisal hemp and coco-palms. Considerable numbers of cattle, sheep and goats are pastured. Dar-es-Salaam, on the coast, is the capital, and Tanga a port.

We are progressing north in our travels and next must consider Kenya Colony, before the World War British East Africa. Central Kenya is a lofty plateau, varying from 5,000 to 8,000 feet. From this plateau rises beautiful Mount Kenya, a height of 17,000 feet. Nairobi, the capital, is 5,450 feet up. It is this height which makes Kenya a white man's country. Animals which sportsmen call "big game" still roam through Kenya, and a journey on the railway through the country would be an exciting affair. In Kenya there are about 10,000 Europeans, 36,000 Asiatics and 2,500,000 Africans, belonging to the Masai, Swahili, Bantu and Galla races. The chief port is Mombasa, unhealthily situated. Because of its varying altitudes Kenya has greatly varied products and is a land of great promise. Ordinary dairying is profitable. Wheats and barley can be grown, as may also cotton, rice, coconuts, groundnuts, coffee and sugar. Lake Victoria Nyanza, which lies between Kenya and Tanganyika, is the second largest fresh-water lake in the world. It is now well supplied with vessels for travel and business.

THE PROTECTORATES OF ZANZIBAR AND UGANDA

Linked with the government of Kenya are the protectorates of Zanzibar to the east and Uganda to the west.

Uganda is about twice as large as Wisconsin, and, with its population of three millions, one of the most populous parts of Central Africa. It is an important link in the great Cape-to-Cairo railway scheme, and reaches also to the Indian Ocean by rail to Mombasa. The native capital is Mengo, or Kampala. British government officials make Entebbe their headquarters. On the western side of the country stretches the

snowy range of Ruwenzori, 17,000 feet, which divides it from Belgian Congo.

The island of Zanzibar is separated from the mainland by a channel twenty-two and a half miles across at its narrowest part. In the sixteenth century the Arabs of the east coast sought help from the Arabs of Muscat in driving out the Portuguese. In 1832 the Sultan of Muscat transferred his capital to Zanzibar. As traders and slave-raiders the Arabs had great power over Eastern Africa and far into the interior. Zanzibar town has an excellent harbor which was formerly a centre for trade along the whole east coast.

Dating from 1890, the British control of the Sultanate of Zanzibar includes the islands of Zanzibar, Pemba, some smaller islands and a strip of African coast. More cloves are grown in Zanzibar than anywhere else in the world. The large plantations are chiefly owned by Arabs.

BRITISH SOMALILAND AND THE HUGE TRACT OF THE SUDAN

Northward of the Kenya Territory, Italy owns the African Somaliland coast to beyond Cape Guardafui. Farther toward the entrance to the Red Sea, and opposite Aden, is British Somaliland. It is inhabited by about 300,000 Mohammedans who are mostly nomadic, driving their cattle and sheep from place to place according to the season. The capital is Berbera. The chief exports are cattle and sheep, hides and skins, and gum.

Completing the list of British protectorates on the east coast of Africa is the enormous tract of the Sudan. This country extends from Uganda down the courses of all the Nile's tributaries leaving the central lakes and mountains, and those that leave Abyssinia. It goes as far as Wadi Halfa. The central forests and swamps, the main courses of the Atbara, the Blue Nile and the White Nile, the plateau of Darfur back to French Equatorial Africa, the Nubia and Libyan deserts—in all more than a million square miles—are included in this great province. The names of the towns in this once "wild waste" all tell a story. Khartum speaks of Gordon's death, Omdurman of Kitchener's victory, El Obeid of Hick's massacred Egyptian army.

The Sudan has reached a stage when it can show a vastly improved store of cattle. Its old trades in ivory and gum arabic are continued briskly. To them

A WEST AND AN EAST AFRICAN CAPITAL.



Freetown, the capital of Sierra Leone, as seen from the sea.



Carriers at rest outside Dar-es-Salaam, the capital of Tanganyika.

in several districts is being added the growth of cotton.

THE UNHEALTHY SETTLEMENTS ON THE WEST COAST

Now let us leave the east side of the continent and take a big leap over to the coast lands around the Gulf of Guinea. British settlements here, which began the earliest, have always had the worst name. The difficulty has been that of human health. In fact, the low coast has been called "the white man's grave." Nowhere has there been deep penetration into the country, except recently in Nigeria. Modern science with its work against tropical disease may some day raise the barrier. Now the general plan is to have a small colony on the coast and a considerable protectorate behind it. Gambia, for instance, has an area of sixty-nine square miles only, but the adjoining protectorate has 4,000. The protectorate consists of a strip of land extending six miles on each side of the river Gambia to a distance of about two hundred miles in a direct line from the sea. The river is deep enough for seagoing ships. Much of the land is cleared for cultivation. The inhabitants, who are thrifty and industrious, belong to the negro race almost entirely. The European residents are officials, traders or missionaries, and their number is around one hundred. How did trading begin on this rich coast?

Usually a fort was built where the traders lived, and some protection was offered to friendly tribes around. As time went on, this pulled things together somewhat, but the Europeans did not look upon themselves as permanent settlers. They were traders who would presently go home. The colony of Gambia has been occupied since the reign of James II. Its capital is Bathurst. It exports groundnuts, beeswax, palm kernels, rice, cotton and maize.

GOLD COAST, SIERRA LEONE AND NIGERIA

The Gold Coast is the oldest of the British African colonies. It produces a fair amount of gold, but more valuably cocoa. Behind its coast-line is the native country of Ashanti, and lands still farther inland called the Northern Territories. Its government also administers the small part of German Togoland allotted to Great Britain after the World War. Accra is the capital of the whole

protectorate, which is about 92,000 square miles. Kumasi is the capital of Ashanti. The Ashanti first became known to Europeans early in the eighteenth century as a strong, warlike nation. At the beginning of the nineteenth century they came into conflict with the British. This conflict lasted, off and on, almost a hundred years, until the country was annexed by the British in 1901. The Kumasi tribe of the Ashanti possessed a gold stool on which for years the kings had been crowned. But in 1896, when their chief was taken prisoner, this stool was hidden by the tribesmen and has never been found.

Sierra Leone, or Land of the Lion, was occupied in 1788 to be a home for released slaves. The capital, Freetown, is the largest seaport on the West African coast and has an excellent harbor. Bo, in the hinterland, has a school for the education of chiefs. Sierra Leone is a well-watered, well-wooded and generally hilly country. White men can live safely about forty or fifty miles inland. The wealth of the country comes chiefly from the oil-palm, the kola-nut tree and various kinds of rubber plants. The cotton plant grows freely.

Nigeria is a large colony and protectorate. It covers an area of 336,000 square miles, and has a population of 18,500,000. Lagos is its port, and Kano its great inland trading centre. Nigeria has coal-fields, tin-mines, fine forests and fertile soil. It produces cotton, cocoa, groundnuts, maize, rice, coffee, tobacco, palm-oil and kernels, gum and rubber. A small part of the German Cameroon colony was given to Britain and is ruled from Nigeria. Nigeria is a splendid country for big game-hunting. The animals found there include the elephant, lion, leopard, giraffe, hyena, West African buffalo, antelope and other smaller game. Monkeys and snakes are numerous. In the plateau regions herds of cattle and flocks of sheep and goats are kept.

Thus we see that the African part of the British Empire contains 47,000,000 people. It occupies nearly 4,000,000 square miles, or a larger area of the earth's surface than either Canada or Australia. In Asia the British area is not half as much; though India's teeming millions give it the lead in population.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 3181.

EAST AND WEST IN BRITISH AFRICA



*Kilimanjaro Mountain, Tanganyika.



*Planting beans in Kikuyu, Kenya.



Natives of West Africa building a new roof for their house.



Natives fixing the roof of a house.



A village in North Nigeria.

*© Underwood & Underwood, New York.

HERE AND THERE IN AFRICA



The quayside at Port Sudan.



In the port of Dar-es-Salaam.



*The main street in Mombasa, Kenya.



A family group in Sierra Leone.



The railway bridge at Khartum.



Cape Coast Castle, Gold Coast.

*© Underwood & Underwood, New York.

The Book of OUR OWN LIFE



Development of the brain: in the Piltown man, the Galley Hill man, and in a great modern man.

THE PARTS OF THE BRAIN

THE great majority of people are right-handed; only a few are left-handed. No one is perfectly equal-handed in everything he does, though many people are both-handed in certain respects. The violinist, for instance, has to train one hand for one kind of work, and the other for another, both equally difficult, though different. The pianist has to train both hands to do the same work.

Now, people who know nothing of this subject think sometimes that there is some natural difference between the two hands or the two arms. That is a mistaken idea. The whole question is one of brain, and we have already seen that there are no natural differences between the two sides of the brain.

The first thing for us to do is to trace the connection between the brain and, for example, the arm. At once we find a very remarkable thing, which no one would have expected. If we begin at the great centre—say, in the left side of the brain, which controls all our intentional movements—we find that a large number of fibres from the nerve-cells in it are gathered together to form a bundle, which is, of course, the great path of the will. This bundle runs down through the left side of the brain, but gradually

CONTINUED FROM 2947



approaches the middle line of the body. Then, at a certain point, practically the whole of it crosses over to the right side. This happens in the part of the brain called the bulb. The consequence of

it is that the left side of the brain is the master of the right side of the body. Exactly the same is true in respect of the right side of the brain and the left side of the body. When we call a person right-handed, then, we really mean that he is left-brained, and that a left-handed person is right-brained. In either case we must describe the brain as having a leading, or more important, half. Soon we shall come to see that when a person is left-brained, not only the use of the right hand, but many other functions of the body are affected.

We have already learned that the two sides of the brain at birth are apparently the same, so far as anyone can make out. Even in later years no one can find any difference between them. Why, then, do people become left-handed or right-handed? Why are there so few left-handed to so many right-handed people? If the two sides of the brain are naturally the same, why are we not all ambidextrous, or both-handed? It is best to begin answering these questions by settling the last point first. The rea-

son why we are not both-handed is for economy. Life does not like waste. If one thing will answer her purpose, Nature does not employ two. When the education of the brain starts, if one side of the brain has the advantage Nature favors that side.

WHY ONLY ONE SIDE OF THE BRAIN NEEDS TO BE EDUCATED

There is no need for both sides of the brain to be equally educated. One side gets an early advantage, and then the more it has, the more is given to it. But it must never be forgotten that the less-educated side of the brain is naturally just as good as the other. There is always this other half of the brain to fall back on. We must now see how this works out.

A man of seventy may meet with some kind of accident or injury, visible or invisible, which prevents the working of the leading half of his brain—the left half, if he is a right-handed man. There is still the right half of his brain available for the same kind of work. With labor and patience he may be able to teach the right half of his brain to do very imperfectly a few things which the left half of his brain used to do. But in cases like this the poor man is almost as badly off as if he had nothing to fall back upon. The reason for this is that when people get old the brain's power of learning becomes less. Youth is the best time to learn.

HOW THE BRAIN REPAIRS AN ACCIDENT TO ITSELF

Let us take the case of a little child of five or thereabouts. He can talk, and perhaps even read a little. He can draw, and even make a few simple letters with his right hand. Some accident may affect the working of the child's brain, just as in the case of the old man, but the difference between the two cases is tremendous. The right half of the little boy's brain now simply takes the lead. It is true that he has to begin again by saying "Papa" and "Mamma," like a baby; but because his brain is young and still developing, a child like this will, in a year or two, be practically as well off as if the accident had never happened at all. Such cases are not very common, but are quite well known.

But we have set ourselves some questions which must be dealt with. We have to find out why there are about ten or more right-handed people to one who is

left-handed. The puzzle is greater because there is nothing to be found in the brain itself to explain this difference.

Well, in the first place, it is certain that custom, tradition and prejudice have something to do with the difference between the numbers of right-handed and left-handed people. It is probable that a considerable number of children are born with no natural bias in favor of either hand. However, it seems certain that there is a common natural bias toward right-handedness, and this requires explaining. One explanation is that the tendency is inherited, and this is interesting as far as it goes, but it does not tell us how the tendency began.

SOMETHING ABOUT THE BRAIN THAT NO MAN UNDERSTANDS

It seems certain that, even apart from imitation and education, right-handed parents tend to have right-handed children, and so on. We already know that the question of the supply of blood is perhaps the most important of all questions for any living tissue. We know that it is, above all, important for nerve-cells. When the flow of blood for nerve-cells is interrupted for two or three seconds, a person faints. It would be very interesting if we could find any difference in the blood-supply of the two sides of the brain. Some people have supposed that perhaps the left side, as a rule, gets a rather more rapid and fuller supply of blood than the right. If we examine blood-vessels in the chest, from which the arteries run to the head, we find some evidence in favor of this view. The arteries are so arranged that the blood supply to the left side of the head seems rather more direct than to the right side, but when we examine the brain itself it is impossible to find that one side is more favored with blood than the other.

The truth is that, after all these years of study, and though a whole library of books has been written on the subject, we still do not really know why more people should be left-brained than right-brained, except that the bias of education is partly responsible. This question would be less important if the difference between the leading half and the other half of the brain were only a question of the comparative skill between the two hands, as most people think. That is the least part of the whole matter. Within the last twenty or thirty years we have

learned that the right-handed (left-brained) person is not only more skillful with the left side of his brain in the use of his hands, but he speaks and writes with the left side of his brain; he reads with it; he follows music with it; and left-handed people do all these things with the right side of their brains.

Let us begin with the case of hearing. Everything goes to prove that, so far as the mere hearing of sounds is concerned, the two sides of the brain are equal in every healthy person; but there are certain kinds of sounds which we call language, and they introduce another need. It is not enough to hear: we must also understand.

It has been proved that in right-handed people the understanding of words is entirely done by the left side of the brain. A special part of the brain there has been taught to perform the duty of understanding words. It is called the word-hearing centre. If it is thrown out of action by anything the ear will hear perfectly, but only as a child hears, or as we hear an



The gray matter of the brain, showing some of its 3,000 million cells.

unknown language. There is good evidence to show that where people know more languages than one, each language has its own little centre, developed by education, situated near or on the outskirts of the ordinary hearing centre in the leading half of the brain, whether that happens to be the right or the left.

We have all noticed that sometimes when we are not attending to the talk of those around us we hear something that has been said but do not understand it, and so perhaps we say: "I beg your pardon"; and before our friend has time to repeat what he said, we have understood it. The words were recorded and heard in the hearing part of the brain, but the reason why we did not realize what was said was that the sounds had not been *taken* from that part to the word-hearing centre, where alone they could be interpreted. A second later, when we attended, that happened. A case like this helps us to understand, not only the working of the brain, but also what is meant by attention.

In the case of

music, also, it seems that there is a special centre developed in connection with, and close to, the hearing centre in the leading half of the brain. The brains of some well-known composers have been examined after their death, and it was shown that some of them had a specially rich development of the cells in this part of the brain.

Let us turn to the case of seeing. We are certain that things are seen perfectly on both sides of the brain, but we know that in right-handed people it is only in the left half of the brain that reading is accomplished. If the word-seeing centre is thrown out of order, the person will see as well as ever; he could make perfect copies on a piece of paper of the letters he has in front of him; but they mean no more to him than to a baby.

THE AREA OF THE BRAIN WHICH HAS BEEN GROWING FOR AGES PAST

It is probable that, as is true in the case of music, the higher kinds of seeing are done in the leading half of the brain. It may be that the kind of seeing done by the artist is done by the leading half of the brain. According to some students, it may even be that we also appreciate color in the leading half of the brain.

This is a subject about which we have yet a great deal to learn. It is possible, however, to find out, in a given brain, precisely the exact limits of the seeing area, which, as we know, is at the very back part of the new brain. We find that this seeing area has been growing in the progress of animal life, and that it is much larger in man than in any other creature. It also varies very largely in different human beings. In the brains of some of the lowest savages we find that the vision area is small compared with the brains of individuals of higher races.

Now, the hearing and seeing of words come first in order, because we must receive before we can give. The word-hearing centre first develops in a child, and after that the speaking centre. These really form a pair. In those who have been taught to read and write, another pair is developed—the reading, or word-seeing, centre and the writing centre. Let us now study the speech centre.

THE POWER OF SPEECH A GREAT POSSESSION OF MANKIND

We have only to think for a moment to realize that in some ways the speech centre must be the most wonderful and important part of the human brain. Of

course, reading and writing are enormously important, but they are really only a newer kind of speech. Now, it is speech, or language, that is one of the great distinctions of mankind. We may say that the speech centre in our brain marks the beginning of what really makes us human, and far more wonderful than any other living creature.

Of all the special centres in the human brain, this was the first to be discovered. This is very appropriate, as it must have been the first to be developed. It was discovered by a celebrated Frenchman named Broca about the middle of the nineteenth century, and it is known as Broca's area. If we examine the brain, and note in the area for motion the various points that control the various muscles of the body, we find that the speech centre lies in the same part of the brain as that which controls the muscles of the lips, tongue and jaws. But it would be a great error to suppose that that is all the speech centre does. The muscles we use in speaking are all represented on both sides of the brain; but it is one thing to be able to move them and another to be able to speak with them. If anything happens to throw the true speech centre out of action, we can still use all the muscles, but though we may say words, we use them like a parrot, not understanding the words we speak.

HERBERT SPENCER'S INTERESTING IDEA ABOUT THE BRAIN

Herbert Spencer, the philosopher, once suggested that in good thinkers the two sides of the brain were probably used together much more than in ordinary people. When we look at the huge bundle of fibres that run across from one side of the brain to the other we can see the force of this. Some day it may be proved that Herbert Spencer's theory is true, not only of thinking, but also of understanding and creating poetry and music, beautiful pictures, and so forth. One of the interesting questions yet to be decided is how far education can develop both sides of the brain without waste of power and without lowering the quality of the education of both sides. And one of the interesting questions that have been decided in our time is the fact that either side of the brain can be educated for special purposes, and that if one side fails, the other will do if we call upon it in youth.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 3221.

The Book of GOLDEN DEEDS

THE QUIET HEROES OF THE WORLD

THERE are many kinds of heroes. The soldier who comes home in triumph, to the sound of trumpets and the waving of flags, leaves behind him on the battlefield the hero who has fallen in the fight. It is a fine and thrilling thing to see the conquering hero come, but we don't forget to think of the hero who will never come again. And let us remember, always, the heroes of every day—the boys and girls who do noble things that are not written about in books. Let us remember the great heroism of simple lives, the golden deeds of quiet, simple people. We read in other parts of our book of great things done by great men and women, and many heroes are among these famous people. But we shall read here of great things that have been done by simple people whose names, perhaps, are not known at all. This is the great book of simple heroes and tells of the golden deeds that lighten up the pathway of the brave.

A VILLAGE OF HEROES

IF you have been in Derbyshire and have traveled among the beautiful hills which are called the Peak Country, you have passed, perhaps, through the little village of Eyam. It is only a hamlet, but the sight of this little group of houses and the little village church is one of the things that ought to thrill every boy and every girl who loves a golden deed.

Perched snugly in a green hollow of the rocky uplands, Eyam must have been as pleasant a village to live in as could be found in the days when William Mompesson became rector at the village church and William Stanley preached in the village chapel. That was in the time when the Great Plague of London was raging, some three hundred years ago. Eyam was one hundred and fifty miles away from London, and no place could have seemed safer from the plague than this.

But the little invisible microbes that carry disease about the world travel in many ways. They come on the wind, and they come in the train. They came to Eyam in a packet of patterns posted from London to the village tailor. The Great Plague of London was in that little packet, and in a few days the tailor and his family were in their graves.

There was terror in the village, and one by one the people fled. But the plague remained, and for a year it spread. All through this time the

rector and his wife, with the minister of the little chapel, nursed the people

through their sickness and sustained them in their grief. In their deep sorrow the people of Eyam were like one family.

Then the brave heart of the rector's wife, Catherine Mompesson, began to fail. People were dying on every hand; there was no hope for her husband and her children, and she urged the rector to flee. In that terrible hour the rector was true to himself. He urged his wife to take away the children and save herself and them. But Catherine Mompesson was not such a woman as that. She sent her children away to friends and stayed with her husband.

The crisis had come. The plague held Eyam fast, and it was clear that any further flight of people from the village would spread the plague in the villages around, perhaps through all Derbyshire, perhaps right up through the north of England, which was yet free from it.

When this time came the people of Eyam, led by William Mompesson and William Stanley, made a great decision, which ought to be written down in the history in letters of gold. They shut themselves off from the world. The church was closed, and every day the people met to comfort one another in a cave. Trade was given up, every man left his work, the schools were shut, and the houses became

hospitals for the sick. Nobody came into the village and nobody went out, and all the work that men and women did was nursing the sick or burying the dead.

For four months Eyam was left to itself without once coming into touch with the world. Had the king died, nobody in Eyam would have known anything about it, so completely shut off were they from the world about them. They shut themselves up in June, and in July fifty-six of them were laid in the churchyard. In

August seventy-two more died, among them the brave Catherine Mompesson. So, day after day death took away the brave people of Eyam until, by the middle of October, 1666, when the plague suddenly ceased, there was not one whole family left, and out of three hundred people two hundred and fifty-nine had died.

That is the golden deed of an English village, and the memory of this village of heroes helps us to understand the stuff of which heroes are made.

THE FRIENDSHIP OF DAMON AND PYTHIAS

DIONYSIUS was a tyrant who ruled the town of Syracuse, in Sicily. Whoever made him angry was put to death. The tyrant's wrath fell one day upon a youth named Damon, who had complained of the cruelty of Dionysius, and Damon was condemned to die. He begged first to be allowed to go to see his wife and children, but Dionysius laughed him to scorn. "Once you get out of my way," he thought, "you will never come back."

Damon said that he had a friend who would answer for his return, and his friend Pythias came forward to offer himself as surety for Damon. If Damon did not come back, he said, he would die in his friend's place.

The tyrant was astonished that a man should love his friend so dearly, and he gave Damon six hours to go to see his wife and children.

Damon expected to be back within four hours, but when four hours had gone he had not come. Five hours, then almost six hours, passed, and still there was no sign of him. The happiest man in the prison was Pythias, who actually hoped that Damon would not return, because he was willing and anxious to suffer

in his place and spare his friend for the sake of his wife and children. The death-day dawned; the death-hour drew near. Dionysius had already come to see his prisoner die.

Quietly and bravely Pythias prepared for his execution. His friend, he said, had had an accident, or perhaps he was ill. At almost the very moment for the execution, however, Damon arrived and embraced his friend. He was tired and travel-stained. His horse had been killed and he had had to get another, but by hard riding he returned just in time to save Pythias from death. But Pythias did not wish it so. He pleaded with Damon, he pleaded with Dionysius, to let him bear the punishment.

Dionysius had never before seen such faithfulness. Here was something beautiful that he did not think existed in the world—a friendship that welcomed death if death would help a friend. His heart was stirred within him; he wanted men like these to be *his* friends. Going up to Damon and Pythias, as they were disputing, each eager to give his life for the other, he took their hands, set both free, and begged to be allowed to share their friendship.

THE LAST FIGHT AT THE COLOSSEUM

IN the proud days when Rome ruled the world, and the emperor lived in a palace of white marble, or in a house of pure gold, the Colosseum was the greatest theatre ever known to be set up on the earth.

There to this day it stands, shattered and broken, but still perhaps the most impressive ruin in all the world. In the dark days when Rome was falling from her great place in the world, when Peter

and Paul were martyred outside the gates, the little band of Christians hid themselves in great holes in the ground, lest they should be tortured and put to death. To this day we can walk through the catacombs in which the first followers of Jesus hid themselves from Nero, the monster who lived in a golden house inside the city gates. They say that when Nero's house was burned the streets of Rome ran with melted gold.

In these dark and shameful days the great white Colosseum, rising from the ground in many tiers of marble seats, enough to seat forty thousand people, must have been a wondrous sight. Here came all Rome to see the great wild beasts turned loose in the arena in bloody contests. Here came the gladiators, strong men trained to fight unto death. Here the Christians were thrown alive to the lions to make a holiday for the Roman people. No place in the world has seen more cruel sights than this.

But slowly Christianity made its way, until the emperor himself became a Christian. Then these shameful things ceased,

Colosseum, cheering the brave general. There were battles with the beasts and feats of daring as in the old days, when suddenly there came out of one of the narrow passages leading into the arena a gladiator, with spears and swords. The rejoicing of the people knew no bounds.

Then a strange thing happened. Into the middle of the arena came an old man, bare-headed and bare-footed, calling upon the people to prevent the shedding of blood. The crowd yelled savagely at him to stop interfering and to go away. The gladiators came forward and forced him aside, but still the old man thrust himself between them. A storm of stones



The ruined Colosseum, where men and wild beasts fought in the old days of Rome.

and the Colosseum became only a circus. The people, however, still longed to see the old thrilling sights, and at times their fury would break out afresh. The Christians had been growing stronger and stronger for four hundred years, when there came a terrible day for Rome. Alaric, the leader of the Goths, came thundering along the borders of the land, bringing to the people terror such as had not been felt since the black days before Camillus drove away the Gauls. Now, Rome, having only a poor mad boy for its emperor, must have fallen but for a brave general and his men, who put the Goths to flight.

Much rejoicing there was in Rome that day, and the people flocked to the

fell upon him from the angry people. The gladiators struck him down, and the old man perished before the eyes of Rome.

He was a hermit named Telemachus, one of those holy men who, tired of the wickedness of the world, had gone to live in the hills. Coming to Rome to visit the sacred shrines, he had seen the people flocking to the Colosseum, and, pitying them for their cruelty, had gone to prevent the fighting or to die.

He died, but his work was done. All that was best in Roman hearts was stirred by the sight of the hermit slain in the arena, and there was no more slaughter in the great theatre. It was the last gladiatorial fight in the Colosseum.

OUT OF THE DEPTHS OF THE EARTH

"FIRE! Fire!" the dreadful word sounded and gathered volume. Smoke, first in little jets and then in belching masses, spurted and burst out from sheds and engine-houses at the shaft of a great lead mine in Missouri. Fanned by a strong wind, the flames gained in fury, and as the timber-curbing in the shaft caught and burned, hot embers fell into the shaft, and heat and smoke descended. The pump was the next to go, and as that stopped working, men looked at one another with drawn faces, for there were two men in the mine. In the sump at the foot of the shaft the water would be filling up—seventy-five, one hundred gallons a minute. The precious air would so soon be exhausted.

"To the drill-hole!" shouted the foreman, and a score of willing helpers rushed to pump air in through a six-inch vent. They met with little success, and the air that issued from the hole was so hot that it nearly scorched the faces of the men who stood over it. For a while they could hear the imprisoned miners near the opening; then the sounds ceased. Men no longer looked at one another's faces, and women fainted.

"I'm going down," said Chew, the stationary engineer. A wet apron was tied over his mouth and nose, and he was lowered into the shaft by means of a rope and a windlass. Forty feet down the air was so hot that he was nearly overcome. He was drawn to the surface, and lay there, limp, gasping and inert.

"Put the rope on, men," said one of the miners. "We can't let those chaps go!"

He in turn was lowered through blinding smoke and scalding steam until he reached the floor of the mine, a hundred feet down. Chew, by this time, had recovered, and insisted on going down the shaft a second time. They soaked the apron again and bound it over his mouth and nose. Once more the rope was secured and he swung clear and began to drop. He reached the foot, and joined the miner who had gone down before him.

Which way to go? The workings stretched in every direction away from the shaft, and they could count on only a few moments' strength and safety. They chose the path that led most directly to the vent-hole, since it was

there that the men had last been heard. Choked at every breath by acrid smoke, they staggered along, finding their way by feeling the rough sides of the workings with their hands.

Suddenly Chew gave a muffled cry and seized his companion's arm, pointing ahead. They darted forward and reached a figure huddled against the wall and bending over a black prone mass. The miners were found! One was completely unconscious, and the other dazed, blinded and almost helpless. There was not a minute to lose. With the unconscious man between them, Chew and his companion returned to the shaft and gave the signal to make ready to hoist. Then they secured the rope about the helpless body, and waited only to see it lifted before starting back to the other prisoner. Ten feet, twenty feet, and the miner fell down, violently sick.

"Go on," he gasped, "I'm done!"

Chew had now two men on his hands, and knew that his own resistance was nearly at an end. As rapidly as possible, he assisted the miner back to the shaft and sent him to the surface, then for the third time turned back, groping through the blinding pall back to the niche in the wall. The other man was still alive and able with some assistance to walk, and after what seemed hours they reached the bottom of the shaft.

Would the knots ever tie? How hot the rope had become! There was no room in Chew's mind now for any thought but his anxiety lest he should forget the signal to hoist. At last everything was taut, and the burden lifted. It disappeared and he waited, and nothing came. Hours passed—it seemed to the suffocating man who could hear nothing but the sledge-hammers in his temples. What had become of the rope?

"Hurry, men, hurry!" he shouted, and something swung against his face. It was the rope, and with slow and bungling fingers that worked in unwilling obedience to the obsession in his brain he bound himself and jerked the rope. He knew no more until he awoke hours later in his own bed.

"The—others?" he said haltingly.

"All safe," smiled his wife, with eyes that seemed to Chew to have felt the smoke too, so was their clearness dimmed.



THE RACE WITH THE WOLVES

ONE still night in the depth of winter a Russian baron set out from the little frontier town of Rob-rin. The snow lay knee-deep in the streets, and was still falling as the baron, with his wife and child and his servant Eric, got into the sledge and started on the next stage of his journey home to Petrograd.

The landlord of the inn begged him not to attempt to travel that night, as the roads were full of snowdrifts, and packs of hungry wolves were known to be in the neighborhood. But the baron was anxious to get on to the next town, called Bolisov, where he was expecting dispatches of great importance; and so the order was given to start, and the four swift horses dashed forward into the darkness.

All went well at first, though the depth of the snow on the roads put a heavy strain upon the horses, which at times were plowing through five-foot drifts. But the baron hoped for better going in sheltered places where the road dipped through the forest. They had already reached the protection of the first trees when the baron's wife suddenly exclaimed: "Hark! What was that?"

The party listened intently, and then in the distance they heard a long, melancholy wailing that rose and fell on the still night air. There was no mistaking that sound; it was the howling of a pack of wolves. The horses heard it, too, and in their terror galloped faster than ever. But little by little the terrible howling grew nearer.

The baron and his servant got ready their pistols, and none too soon, for, looking back, they saw gray, shadowy forms coming across the snow, and they knew that the wolves were fast overtaking them. Faster and faster flew the horses, straining at the harness and rocking the sledge from side to side. But the wolves drew steadily nearer. There

was a large number of them, led by an enormous old gray wolf who, as soon as he got alongside, tried to spring upon one of the horses. Bang went Eric's pistol, and the wolf sprang into the air and fell down dead. At this the others fell back for a few moments, but they were soon again in full pursuit. This time the baron and Eric fired together, and four wolves fell dead in the snow. The rest of the pack paused for a moment hastily to devour the fallen wolves, but were soon again in full pursuit.

"There is no help for it. We must turn one of the horses loose," cried Eric. "Cut the traces."

This was done, and one of the leaders dashed aside into the forest, with the whole pack of wolves after him.

"We are saved!" cried the baron.

But his servant Eric knew only too well that the hungry animals would soon come on again. Surely enough they did, and then another horse had to be sacrificed to gain a few moments' time.

The carriage was now within two miles of Bolisov, and the lights of the outlying houses could be seen in the distance. The party in the carriage thought they were saved; but as they galloped along it became evident that the horses were tired out, and were slackening speed, while the wolves were once more rapidly overtaking the party. Then it was that the servant Eric proved himself a hero.

"I will get down, baron, and keep the wolves at bay while you, with your wife and child, get away to the town. If we stay together we shall all perish. But perhaps I may have time to climb a tree, or I may manage to keep the wolves off till you return with help. If they kill me, take care of my wife and child!"

The baron could not bear the thought of losing his faithful servant in this way, but Eric was determined to risk his life to save his master. The wolves were now

on both sides of the carriage, and the leading ones were snapping at the horses' legs.

"Now God be with you all!" cried Eric. "Fire as I jump out!" The baron fired, and his faithful servant sprang into the midst of the wolves. The savage animals stopped for a moment with the blaze of the pistols in their eyes. Then came a fearful, savage yell, and Eric fired again at the wolves. Then there was

silence as the horses dashed forward to the town.

Eric was never seen again, but his pistols were found lying in the blood-stained snow. A stone cross now stands on the spot, bearing the name of the hero on one side, and on the other the words: "Greater love hath no man than this, that a man lay down his life for his friend."

HOW THE CHILDREN SAVED THE TOWN

THE little town of Spinalunza, in Italy, was built on a long ridge of rock surrounded on three sides by a deep ravine, so that an enemy would attack it only from the west. On the hill-top stood the cathedral, with its great square, where the children played. Long, long ago, when things were very different in Italy from the way they are now, city walls and gates were needed. For there was much fierce fighting between city and city or between a band of men under one captain and a band of men under another captain. The cities of Pisa and Florence were often at war against each other.

On a certain autumn day a fierce captain, with eight hundred horses and two thousand men, knocked at the gates of Spinalunza, demanding admission in the name of Pisa. The war bell was rung, and the people ran to defend the walls. In the morning the captain shouted from outside: "We are from Pisa; Florence is attacking us, and we must hold this town for our safety. All we ask is a pledge that you will not join Florence against us."

"What pledge do you ask?"

"Let twenty of your children ride with us to Pisa; they shall be well cared for."

A messenger was sent out to the captain to say: "To-morrow the gates will be thrown open, and the children will come out for you to make a choice."

The Pisans spent the night in drinking; the children slept while their parents prayed. An hour after midnight the garrison of Spinalunza met in the square and divided into two bands, which were ordered to descend into the ravine on the eastern side of the town, and make their separate ways until they had the enemy between them.

At daybreak the bells began to ring, the gates were thrown open, and the children trooped out, singing and holding a cross aloft. The townspeople wondered as they saw behind each child an angel with a fiery spear. As the singing children swept through the gates panic seized upon the Pisans. Their horsemen fled, plunging in terror through the ranks of the footmen, and in this scene of confusion the townsmen, waiting in the woods, rushed down and put the enemy to rout.

So the children saved the town, and if you go to Spinalunza you will see groups of children playing still in the cathedral square amid the orange trees and the pomegranates.

THE UNDYING LOVE OF A SISTER

TWO young Romans, Simplicius and Faustinus, had a much-loved sister—a noble maiden named Beatrice. They lived in Rome at a time when persecution of the Christians had ceased, and all three worshiped the living Christ in peace.

But a new emperor came to the throne, and the old persecutions began again. The two brothers were called upon to deny Christ. They refused. Then they were tortured, beheaded, and their bodies were thrown into the river.

Beatrice haunted the riverside to rescue their dear bodies from dishonor. When she found them, she carried them in secret to a cemetery and gave them Christian burial. Then it came her turn to suffer for refusing to worship the idols, and she was strangled.

A faithful old woman who had helped this brave girl to find the bodies of her brothers rescued the body of Beatrice, and laid it in the same grave with her brothers.

THE NEXT STORY OF GOLDEN DEEDS IS ON PAGE 3465.



A painting of Venice by J. M. W. Turner.

THE WAY WE HAVE COME

A SUMMARY OF EUROPEAN PAINTING.

THE story of European painting is one of the stories of human effort and aspiration, a story of long striving to find a better way of expression. Suppose that you have carefully set up a house of cards and find it very pleasing, when along comes a little brother and, with a sweep of his hand, topples it over, shouting: "No! this way!" Then you must watch him set it up again in a way he thinks better than yours. A procession of such rebuildings on new lines has resulted in painting as we know it to-day.

Always men have tried to get free from the limitations that they felt were shutting in art, the "musts" and "must nots" of established forms; and always when they have thrown down the walls of one method of teaching or convention they have set to work to build up new walls of some different method or convention.

First in Italy, think of the city of Florence in the Renaissance, when old Byzantine modes gave way to fresh expression in the minds of Giotto, Fra Angelico, Masaccio, Botticelli, Ghirlandaio and the commanding genius Leonardo da Vinci. But remember that Michelangelo, following close upon these, could not bear any tradi-

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tion in art, and by the might of his personality founded a new school of his own, creating, as has been said, a race of giants for his use—so full of wonder was he in his study of the human form.

Those who tried to copy him, however, could not handle giant forms successfully, because they were not themselves giants in genius.

Think of Venice with the Bellinis, Giorgione, Titian, Tintoretto and Paolo Veronese—the sumptuous lines and colors on their canvases. Think of Raphael, who started in the Umbrian school, gathered up all that was most fascinating in earlier Italian genius, and touched whatever he took with something rare that belonged to himself alone, giving the world a treasure "personal and new." Yet remember how Caravaggio revolted against the idealism and academicism of Raphael's followers, preaching "naturalism" in his own pictures, where street types and violent episodes were presented, instead of festive scenes or figures of saints and angels. And although Caravaggio's method, his tradition, found many admirers and followers through the centuries, it has, very near our day, become the object of attack by the plein-air painters,

who show that his black, heavy shadows are not true to nature outside of walls, but were painted within the limits of a studio.

Influences and reactions between one school and another, between one country and another, crossed and recrossed as the fabric of art grew broader and longer. France and the Netherlands early caught up gleaming threads from Italy; but where "Italian art dreamed of beauty," "Flemish art was in love with truth." And Italy herself learned from the Flemings new processes that added to the beauty and splendor of painting in oils. Among the early Flemings remember the Van Eycks, Hubert and Jan, than whom no greater portraitist has ever lived; remember Roger van der Weyden and Memling—all of them living before America had been found.

Jan van Eyck, you may recall, made visits to Spain, where the greatest painter in all the world—from the point of technique—was to appear about two centuries later—Velasquez. Spain, in the persons of El Greco, Ribera and Zurbaran, had shown the touch of Italian influence—especially the realism of Caravaggio—before Velasquez awoke to his own strong interesting genius through the study of Titian and other Venetians. Murillo followed, then Goya with his power of realism mingled with dramatic feeling. Spanish painting, from Ribera to Zuloaga, is essentially and unmistakably Spanish, whatever influences may have gone into its development through the changing years.

And in the Netherlands we find strong racial characteristics always leading. Nature, whether in portrait or in landscape, is presented truly and simply with an air of at-homeness. Recall the portraits of Frans Hals and of Rembrandt, who, like Velasquez, "created a light all his own." Think of the landscapes of Van Ruisdael and Hobbema; the animal pictures of Cuyp, than whom none ever

made better ones, and of Paul Potter; the genre pictures of Pieter der Hooch, Terborch and rare Vermeer, whose few "luminous masterpieces are among the most beautiful works in the world." And Flanders of the seventeenth century offers great names—Rubens, the astonishingly rapid painter of big canvases; Van Dyck, whose many aristocratic por-

traits of kings and their court circles are an index of his own delicate feelings; Teniers, a great portrayer of peasants.

German painting, early touched with Flemish influence, reached its highest plane in the sixteenth century in the superb performance of Dürer and Holbein—Dürer, like Leonardo da Vinci and Michelangelo, deep thinker as well as artist; and Hol-

bein, the only German painter that shows a leaning toward idealism. The spirit of German art expression may be summed up as controlled by "a combination of the wild and rugged with the homely and tender, by meditative depth, enigmatic gloom, sincerity and energy, by iron diligence and discipline."

In France art consciousness has had peculiarly lively play. There violent changes have taken place, and sharp contests between rival parties have added excitement. There dictators of taste have ruled like kings, and there rebellious spirits have broken down the walls of custom to make way for startling new ideas.

After noting the first efforts at independent French painting we come soon to the Academy, the dictatorship of Le Brun, and the grand style of painting in Louis XIV's reign; Poussin, who was devoted to antique story, and Claude Lorrain, whose landscapes glow with poetic floods of light of a kind that nature never produced. With the eighteenth century came a swing to the gayer, more frivolous pictures of the gallant school—the delicate, radiant work of Watteau and Fragonard, and the more insipid prettiness



The Lute Player, by Caravaggio.



A Spanish Flower-girl, by Murillo.

of Boucher, which was followed by a violent return to classic severity of style; a sort of frenzy of devotion to things Greek and Roman, led by David, whose sway was unquestioned for the time. So the nineteenth century opened—a period of war and change. With Gros romanticism came forward, to be advanced still further by Géricault and Delacroix, in spite of the fierce protests of Ingres. Pictures telling stories from history or literature or calling gently upon the emotions became the most admired types.

Then, a few quiet landscapes by the English painters Constable and Bonington exhibited in France, opened certain eyes to a new vision of nature, and the Barbizon artists, willing to be called "heretics," went forth into the field and the forest to make natural studies, minus Italian towers and fountains and statues—just grass and trees and rocks and sky. There were Rousseau, Daubigny, Dupré, Diaz, Troyon—whose cattle fitted poetically into the scenes he painted; and Corot, a little apart from the rest, "a lyric master of exquisite refinement." With these we place Millet, through whose faithful brush the French peasant became a figure of sincere appeal and charm.

Realism and naturalism, gaining momentum, swept to the very front of art life with Courbet and Manet in the middle of the nineteenth century. Painters of the

grand style, classicists and romanticists had all painted different subjects in much the same way. Now came groups that were concerned chiefly with new ways of painting—ways that would convey the feeling of various aspects of light or reproduce an artist's impressions of nature. The technique of Delacroix had shown a boldness leaning toward impressionism, and Corot's later style turned

toward the same end. By the opening of the twentieth century impressionism and plein-airism were felt in the work of almost every painter—"light, the principal person in a picture" having become an accepted idea. Not only Monet, Pissaro, Cézanne, Degas, Renoir, but the more idyllic painters, Bastien-Lepage, Lhermitte and Puvis de Chavannes, set themselves to portray this difficult "principal person." Whether details are carefully preserved or passed

over as hampering the general effect, whether the picture is painted in the open or under the roof of a studio, light is the most absorbing and alluring factor in the modern painter's problem. And France still leads in the quest for a perfect solution of the problem, the search for the best technique.

After an era of imported painters, of whom Van Dyck did most toward founding a British school, England in the eighteenth century awoke to an art of her own when the independent mind of



Portrait of the Artist, by Jean Ingres.



The Water Gate, by Charles François Daubigny.



Boats on the River Oise, by Charles François Daubigny.

Hogarth found expression through a brush that recorded with vigor and originality the life of society as he saw it. His moral-teaching, story-telling pictures and his portraits were the first in that line of admirable paintings that British art can claim. Living at home for the most part, finding at home the subjects they best loved to spend their care upon,

Reynolds, Gainsborough, Hoppner, Romney, Raeburn, Lawrence and the other portraitists, each in his own distinctive way, present to us British men and women and children; and British landscape has found devoted portrayers in Gainsborough, Crome, Constable — the earliest of the modern out-of-door landscapists — and in a host of others. Apart from the rest, Turner, the worshiper of light, surpassed all in expressing the romance of light in color.

In the middle of the nineteenth century, when painting had reached a state of stiffness and formality and was becoming meaningless, the Pre-Raphaelites made a zealous stand to halt the downward march. Rossetti, Millais and Hunt,

with their sympathetic contemporaries Burne-Jones and Watts, served to make men think, whether in admiration and support or in condemnation of their ideas of beauty and worth.

Artists of our own day are almost all eclectics; that is, they select from among the various modes and methods of technique those things which fit into their own

experience and tendencies, and if they are true artists with something to give the world, that something which is part of themselves goes into their work. Those who will live on and add new chapters to the story of arts are, like all those who have become immortal in the past, giving their own expression to a spirit that is universal, that can be "under-

stood as long as humanity lives." No matter in what age he is born, no matter what language he may speak, the true artist belongs to all time and can be understood by men of widely differing tongues. The great master is always "modern," always simple and sincere. In great art all parts of the earth and all ages come together.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 332S.



Photo, courtesy Metropolitan Museum of Art.

The Calmady Children, by Lawrence.



The Old Cook, by Velasquez.



The Artist's Servants, by Hogarth.

AGELESS ART OF THE WORLD



EL GRECO'S MAGNIFICENT PORTRAIT OF AN UNKNOWN MAN, IN THE PRADO GALLERY



Donna Isabella, by Goya.



A Portrait, by Holbein.



Maria de Medici, by A. Bronzino.



The Cook, by Johannes Vermeer.



THE PEARL NECKLACE, BY JOHANNES VERMEER



PORTRAIT OF A MAN AND HIS WIFE, BY FRANS HALS



A LATE SUMMER SCENE NEAR HERISSON, BY HENRI HARPIGNIES



PAYING THE REAPERS, BY LEON LHERMITTE



LITTLE GOODY TWOSHOOES

ALL the world must allow that Twoshoes was not her real name. No; her father's name was Meanwell, and he was for many years a well-to-do farmer in the parish where Margery was born; but he and his wife died, leaving Margery and her little brother to the mercies of the wide, wide world.

Little Margery and Tommy were both very ragged, and Tommy had two shoes, but Margery had only one. They had nothing, poor things, but their love for each other. Their relatives took no notice of them; but Mr. Smith, a very worthy clergyman who lived in the parish where little Margery and Tommy were born, sent for the children. A friend of his ordered little Margery a new pair of shoes, gave Mr. Smith some money to buy her clothes, and said he would take Tommy and make him a little sailor, while Mr. Smith promised to look after Margery.

Next morning the shoemaker came in with Margery's new shoes. She ran out to Mrs. Smith as soon as they were put on, and stroking down her ragged apron, cried out: "Two shoes, mamma; see, two shoes!"

And all the people she met she greeted in the same way, and thus obtained for herself the name of Goody Twoshoes, though her playmates called her Old Goody Twoshoes.

Little Margery was very happy in

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the home of Mr. and Mrs. Smith. She saw how good and how wise Mr.

Smith was, and concluded that this was owing to his great learning; therefore she wanted, above all things, to learn to read. For this purpose she used to meet the little boys and girls as they came from school, borrow their books, and sit down and read till they returned. By this means she soon learned more than her playmates, and devised the following scheme for teaching those who were more ignorant than herself.

She found that only twenty-six letters were required to spell all the words in the world; but as some of these letters are large and some small, she, with her knife, cut out of several pieces of wood ten sets of each of the small ones and six sets of each of the large ones.

Every morning she used to go round with the wooden letters in a basket to teach the children.

I once went with her on her rounds. The first house we came to was Farmer Wilson's. Here Margery stopped, and ran up to the door, giving a tap.

"Who's there?"

"Only little Goody Twoshoes," answered Margery, "come to teach Billy."

"Oh, little Goody," says Mrs. Wilson, with pleasure in her face, "I am glad to see you! Billy wants you sadly, for he has learned all his lesson."

Then out came the little boy Billy. "How do, Doody Twoshoes?" says he, not being able to speak very plainly.

Yet this little boy had learned all his letters; for she threw down the alphabet all mixed together, and he picked them up, called them by their right names, and put them all in order.

The next place we came to was Gaffer Cook's cottage. Here some poor children met to learn, and all came round little Margery at once; and having pulled out her letters, she asked the boy next her what he had for dinner.

He answered, "Bread"—for the poor children in many places live on very little indeed.

"Well, then," says she, "set the first letter."

He then put up the letter *B*, to which the next added *r*, and the next *e*, the next *a*, the next *d*, and it stood thus: "*Bread*."

"And what had you, Polly Comb, for your dinner?"

"Apple pie," answered the little girl; and so the lesson went on.

The next place we came to was Farmer Thompson's, where there were a great many little ones waiting for her.

"Little Mrs. Goody Twoshoes," says one of them, "where have you been so long?"

"I have been teaching," says she, "longer than I intended, and am afraid I am come too soon for you now."

"No, but indeed you are not," replied the other, "for I know my lesson, and so does Sally Dawson, and so does Harry Wilson, and so do we all."

And they capered about as if they were overjoyed to see her.

"Why, then," says she, "you are all very good, and God will love you; so let us begin our lesson."

They all huddled round her, and though at the other place they were employed about words and syllables, here we had children of much greater ability, who dealt in sentences, which they set up and read aloud.

Mrs. Williams, who kept a college for instructing little girls and boys in the science of A, B, C, was at this time very old and infirm, and it was decided that Margery should take up her work. Henceforth she was known as Mrs. Margery.

One day Mrs. Margery brought home a fine raven which she had rescued from the cruel hands of some bad boys.

Now, this bird, which she called Ralph, she taught to speak, to spell and to read. He sat at her elbow, and when any of the children were wrong, she used to call out: "Put them right, Ralph."

She had also a pigeon which she had taught to spell and read, though not to talk. He was a very pretty fellow, and she called him Tom.

Soon after this a present was made to Mrs. Margery of a little dog, Jumper, and a pretty dog he was. Jumper was the porter of the college, for he would let nobody go out or come in without his mistress' leave.

One Thursday morning Jumper all of a sudden laid hold of his mistress' apron, and endeavored to pull her out of the school. She was at first surprised; however, she followed him to see what he intended.

No sooner had he led her into the garden than he ran back and pulled out one of the children in the same manner; upon which she ordered them all to leave the school immediately; and they had not been out five minutes before the top of the house fell in.

The falling-in of the roof was a great misfortune to Mrs. Margery, for she not only lost all her books but was without a place to teach in. But a kind friend had it rebuilt for her.

Mrs. Margery was much esteemed by her neighbors. One gentleman, Sir Charles Jones, held such a high opinion of her that he offered her a considerable sum to take care of his family; but she refused. This gentleman sent for her afterward when he had a dangerous fit of illness, and she behaved so tenderly that he made her promise to marry him. She was happy, for she loved Sir Charles.

The wedding day arrived and they went to the church. But just as the clergyman had opened his book, a gentleman ran into the church and cried: "Stop! Stop!"

This gentleman turned out to be Mrs. Margery's brother, who had just come from beyond the sea, where he had made a large fortune, and hearing of his sister's intended wedding, he had ridden in haste to see that a proper settlement was made on her.

Mrs. Margery, after her marriage, still went on with her good works. She was a mother to the poor, a physician to the sick, and a friend to all in distress.

THE BRAVE LITTLE DOG OF THE WOOD

BRISQUET was a poor woodcutter who lived in the forest of Lyons, with Brisquette, his young and pretty wife, and Biscotin and Biscotine, his two little children.

Biscotin was a merry little brown-haired boy seven years of age, and Biscotine was a charming maiden with bright blue eyes and golden hair, who was not quite six years old. The forest in which they lived was wild and lonely, and their mother would never let them go farther than the shed at the end of the garden

Biscotin and Biscotine ran out, hand in hand, and went merrily down the path leading to the shed.

Bichonne, of course, began to follow them; but their mother called the dog back, saying: "No, Bichonne! Wait till they return, and if your master is still in the forest, you must go alone and look for him."

Biscotin and Biscotine did not find their father in the shed, and they were frightened at his absence.

"Oh, daddy's lost—daddy's lost!"



THE PLUCKY LITTLE DOG WOULD NOT LET THE WOLF COME NEAR THE CHILDREN

where their father stored his wood, lest some wolf should attack them, for there were plenty of these fierce animals about.

Bichonne, a gray-coated little dog with a red nose and soft brown eyes, was their only playmate. But he was so lively and good-natured that they never wearied of playing with him all day long on the green space before the cottage door.

One winter night Brisquet was late in coming home, a most unusual proceeding. "Run down to the shed, my darlings," said Brisquette to her children, "and see if you can find your father there."

said the little boy. "I will go into the forest and find him, or let the wolves eat me!" And he ran into the wild, dark forest, and Biscotine took his hand and went with him.

Shortly afterward, however, the father returned to his cottage by another path.

"Where are the children?" he exclaimed, surprised at their not coming to greet him.

"They went as far as the shed to search for you," said his wife, looking startled. "They must have gone into the forest. Oh, the wolves—the wolves!" Brisquet threw down his load of wood,

seized his ax, and looked round for Bichonne. But as soon as the woodman had appeared without his children, the little dog had barked wildly, and dashed off into the forest.

Brisquet was very angry because his dog was not there to follow him at the very moment he needed his help most.

"I ought not to have had a little mongrel like him!" he exclaimed. "With a good thoroughbred I could easily follow the track of the children."

But on going a little way into the forest he heard the sound of barking, mingled, it seemed, with the cries of children. Tearing wildly up to the spot,

with his great ax lifted ready to strike he saw a sight that filled him with joy and dismay. Biscotin and Biscotine were crouching together underneath a tree, and a great gray wolf was trying to spring upon them. But little Bichonne would not let the wolf come near the children. He was hardly a fourth of the size of the fierce, hungry animal, but he fought with such pluck and quickness that the wolf was unable to reach the children before their father arrived. With one blow from his ax Brisquet killed the wolf, and taking the poor little wounded dog in his arm, he led Biscotin and Biscotine safely home.

THE MYSTERIOUS PORTRAIT

IN the little Japanese village of Yow-cuski a looking-glass was an unheard-of thing, and the girls did not even know what their faces looked like except from the description their lovers gave of their personal beauty.

Now, it happened that a young Japanese one day picked up in the street a small pocket hand-mirror.

It was, of course, the first time in his life that Kiki-Tsum had ever gazed on such a thing. He looked at it, and, to his intense astonishment, saw the image of a brown face, with dark, intelligent eyes, and a look of awe-struck wonderment on the features.

"It is my sainted father. How could his portrait have come here? Is it, perhaps, a warning of some kind?"

He folded the precious treasure up in his handkerchief and put it in a large pocket of his loose blouse. When he went home that night he hid it away carefully in a vase, as he did not know of any safer place. He mentioned nothing of the adventure to his young wife, for, he said: "Women are curious, and then, too, sometimes they are given to talking."

For some days Kiki-Tsum was in a great state of excitement. He was thinking of the portrait all the time, and at intervals he would leave his work and suddenly appear at home to take a look at his treasure.

Now, in Japan, as in other countries, mysterious actions and irregular proceedings of all kinds have to be explained to a wife. Lili-Tsee, his wife, did not understand why her husband kept appearing

at all hours of the day. And so Lili-Tsee fell to watching, and she noticed that he never went away until he had been alone in the little room at the back of the house. She hunted day after day to see if she could find some trace of anything in that little room which was at all unusual, but she found nothing.

One day, however, she happened to come in suddenly, and saw her husband replacing a rose-leaf vase. The moment he had gone she was upon a stool like lightning, and in a moment she had taken the looking-glass out of the vase. Then the terrible truth was clear. What was it she saw?

Why, the portrait of a woman! And she had believed that Kiki-Tsum was so good and so fond and so true!

Suddenly a fit of anger seized her, and she gazed at the glass again. The same face looked at her; but she wondered how her husband could admire such a wicked face.

She had no heart for anything, and did not even make any attempt to prepare a meal for her husband. When, later on, Kiki-Tsum arrived, he was surprised to find nothing ready for their evening meal.

"So this is the way in which you treat me, before we have been married even a year! What do you mean, Lili-Tsee?"

"What do I mean? What do you mean? The idea of your keeping portraits in my rose-leaf vase! Here take it and treasure it, for I do not want it. The wicked, wicked woman!"

"I cannot understand," he exclaimed.

"Oh, you can't?" said she. "I can, though. You like that hideous, villainous-looking woman better than your own true wife!"

"Lili-Tsee, what do you mean? That portrait is the living image of my poor dead father. I found it in the street the other day, and put it in your vase for safety."

"Hear him! He wants to tell me I do not know a woman's face from a man's," replied Lili-Tsee, more angrily.

was probably some slight misunderstanding which he would soon be able to put right.

"My children," he said, putting his head in at the door, "why this unseemly anger? Why this dispute?"

"Father, my wife is mad."

"All women are so, my son, more or less. You were wrong to expect perfection. It is no use getting angry."

"My husband has a portrait of a woman hidden in my rose-leaf vase."



We only know what we look like from the reflection given back by our mirrors. We cannot imagine how others see us, but in the days of old Japan mirrors were not known, and everyone depended upon his friend's description. The priest here is trying to decide between an angry husband and wife. The former declares the mirror to contain a portrait of his father, the latter sees only the picture of a woman, whom her husband seems to love. The priest naturally finds only his own image and defeats the argument of both.

Things really began to look serious. It seemed as if their married life, which had hitherto been passed in happiness, was to be completely spoiled and made miserable by this mysterious portrait.

Kiki-Tsum was wild with indignation. The accusation of his wife was perfectly ridiculous. Of course the portrait was not that of a woman but of his father. It was impossible that he could be mistaken. The loud angry words attracted the notice of a Japanese priest who was passing. He stopped and listened for a moment. Such a quarrel, he thought, must not be allowed to continue. It

"I swear that I have no portrait but that of my poor dead father."

"My children, show me the portrait." They handed it to him in great anger.

The priest took the glass and looked at it earnestly. He then bowed low before it, and, in an altered tone, said: "My children, settle your quarrel and live peaceably together. You are both in the wrong. This portrait is that of a saintly, venerable priest. I know not how you could mistake so holy a face."

He blessed them, and then went away, carrying with him the glass to place with other precious relics of the church.

STORIES FROM THE TALMUD

THE HEIR AND THE WILL

A RICH Jew, on his death, left a will bequeathing all his property to a slave, on the sole condition that the slave should allow the son of the dead man, who was in a distant city, to select just one article from the property.

The slave was delighted with his good fortune, and hurried off to the distant city to inform the son of what had hap-



"Choose the slave," said the rabbi.

pened. Of course the young man was astonished at his father's will, and greatly grieved. He could not understand why he should have treated him in this way, and complained to a rabbi of his parent's injustice.

But having expected sympathy and comfort in his distress, the young man was amazed at the rabbi's words.

"What a wise man your father was!" said he. "This will shows that he was wonderfully far-seeing. By it he has preserved all his property for you. Had he left it to you in his will you would have received little of it, for, the heir being such a distance away from home, the slave would have plundered the estate. But your father bequeathed everything to his slave, knowing that the man would take care of the property when he believed it to be his own."

"But how does all that benefit me when the property is left away from me?" asked the young man in surprise.

"Do you not know that all a slave possesses belongs to his master?" said the rabbi. "You may select just one article. Choose the slave, and then the whole of the property will be yours."

This the young man did, and ever blessed the far-seeing wisdom of his father which had saved his inheritance for him.

THE DINNER AT THE INN

A YOUNG man called at an inn and was invited to sit down to dinner with the landlord, his wife, two sons and two daughters. Five pigeons and a fowl were placed upon the table, and the young man was asked to carve and serve. He looked at the family thoughtfully, then at the birds on the table. After a moment's reflection he began to cut. Dividing one pigeon between the two sons, another between the two daughters, and another between the landlord and his wife, he kept two birds for himself.

The host was surprised at this method of distributing the food, but when the pigeons were eaten he asked the young man to carve the fowl. The youth did so, giving the head to the landlord and his wife, a leg to each of the sons, a wing to each of the daughters, and took the body for himself. The landlord asked for an explanation.

"I have done the best I could to make things equal," said the young man. "You, your wife and one pigeon make three; your two sons and one pigeon make three; your two daughters and one pigeon make three; and I and two pigeons make three. With regard to the fowl, I gave the head to you and your wife because you are the heads of the family. I gave to your sons the legs, because they are the supports of the family. I gave to your daughters the



The young man was asked to carve.

wings, because they will marry, take wings and fly away from your home. I took the body of the fowl for myself because it looks like a ship, and it was in a ship that I came here, and in a ship that I hope to return to my home."

STORIES OF GREECE AND ROME

THE TWELVE LABORS OF HERCULES

As well as cultivating all that is beautiful in art and letters, the ancient Greeks worshiped sheer physical strength. High in honor among their heroes was Hercules, whom they adopted as the patron of strength. "The labors of Hercules" has become a well-known phrase, and the separate titles of the labors are often quoted to-day. In his youth Hercules roused the jealousy of Eurystheus, king of Argolis, in whose power the gods placed him for a term of service. Eurystheus gave Hercules the following tasks to perform.

SNAKE WITH A HUNDRED HEADS

THE hydra was a monstrous water-snake with seven or nine heads, which grew again as fast as they were cut off. This fierce monster devastated Argolis, dragging both men and beasts into the swamp where it lived, and there strangling them. Hercules was aided by his friend Iolus, who applied a lighted firebrand to the stumps immediately after Hercules had cut off the heads with his sword. They both dipped their arrows in the hydra's poisonous gall so that the wounds they gave should be incurable.

SLAYING THE LION

A DREADFUL lion was terrifying the inhabitants of a district in Argolis, coming out of the forest from time to time and killing the inhabitants of the neighboring villages. So powerful was the beast that none dare attack it, and no sword nor arrow could pierce its skin; but Hercules seized the lion in his powerful arms and forced it on its back. Then he knelt upon it and strangled it with his hands. The hero removed its invulnerable skin, and ever after that he wore it around his own shoulders.

THE CAPTURE OF THE SACRED STAG

THERE lived on the Ceryneian Mountain a wonderful stag that was sacred to Diana, the goddess of hunting. Its horns were of pure gold, its hoofs were of brass, and it was so fleet of foot that no man had ever been able to catch it. Hercules was commanded to capture it and to bring it unhurt to Eurystheus. This he succeeded in doing after a full year's chase through the forests of Greece. As he was returning the wrathful Diana met him, but she was appeased when he told her his story.

CLEANSING THE STABLE

ONE of the labors of Hercules has given a proverb to the world, for when we wish to call a task almost impossible of accomplishment, we speak of it as like "cleansing the Augean stables." Augeas was king of Elis and the owner of some three thousand head of cattle. The stables in which these cattle lived had never been cleansed and were in a terrible state of filth, so that the task of cleaning them out in one day seemed impossible even for Hercules. Yet he easily effected it by breaking down a part of the wall, and diverting through the stables a river that flowed close by, thus washing out thoroughly the horrible mire and filth within.



The youthful Hercules.

THE ARCADIAN BOAR

THE neighboring state of Arcadia was in great danger of being ruined by a huge boar which came down from Mount Erymanthus, and spared neither man nor beast. Hercules was accordingly sent to capture the beast. The boar had hitherto defied all the attacks and ruses of the Arcadian shepherd folk, but when the terrible monster saw Hercules it turned and fled up the snow-clad mountains, with Hercules in full chase. He succeeded in bringing it to Eurystheus, however, who was so terrified at the sight of it that he crept into a cask to hide.

THE BIRDS WITH THE BRAZEN WINGS

THE marshy forests around Lake Stymphalis, in Arcadia, were infested by some voracious birds whose wings, talons and heads were of brass. These birds fed on the flesh of men and animals. When sent to slay them, Hercules was puzzled how to get near them, so inaccessible was their nest. He therefore begged Minerva, the goddess

of brave deeds, to help him, and she gave him a brazen rattle. Hercules stood on the shores of the lake and made the woods re-echo with a terrible din. The startled birds flew out into the open, and Hercules shot them one by one with his poisoned arrows.

THE MAD BULL OF CRETE

MINOS, king of Crete, an island to the south of Greece, had once promised to sacrifice a huge bull to Neptune, god of the sea. Because of its great size and beauty, however, Minos had kept it for himself. The bull went mad and began to destroy the crops of the island. Hercules captured it, and brought the raging beast alive to Mycenæ as his seventh labor, but King Eurystheus foolishly let it loose, and it crossed the Isthmus of Corinth and ravaged the valley of Marathon, in Attica.

THE MAN-EATING HORSES

DIOMEDES, king of Thrace, was so cruel that he was wont to throw all strangers to some wild horses, which devoured them. Hercules, with some of his brave friends, sailed to Thrace, attacked and captured the tyrant, and gave him to his own horses to eat. Hercules then brought the horses over the sea to Mycenæ, and drove them up into the mountains, where they were torn to pieces by other wild beasts.

THE GIRDLE OF THE AMAZON QUEEN

IN his ninth labor Hercules had also to make a long journey. This time he was sent to fetch the girdle of Hippolyte, the queen of the warlike Amazons who dwelt in the land of Scythia, in the south of the country we now call Russia. Some say that he killed the queen after a hard fight, and others that he only captured her and gave her in marriage to his friend Theseus. At any rate, he succeeded in his object of bringing the famous girdle back to Eurystheus.

THE BATTLE WITH THE GIANT

FAR away from Greece, in the unknown western sea, there was an island called Gades. Traders brought strange tidings thence of a three-bodied giant named Geryon, who owned beautiful herds of cattle and a two-headed dog to watch over them. Hercules was

sent to fetch these cattle. Many are the tales told by the Greek poets about this journey—how, for instance, scorched by the heat, he tried to shoot the sun-god, who, admiring his audacity, gave him a golden bowl wherein he sailed to the island, passing through the Straits of Gibraltar, the rocks looking down upon which were called the Pillars of Hercules.

The hero slew the giant's herdsmen and his two-headed dog, but just as he was driving off the cattle Geryon came up in hot haste and seized him. After a terrific struggle Geryon was defeated. Even then all was not peaceful sailing homeward, for in Italy a fire-breathing giant called Cacus stole some of the herd, and hid them in a cave, dragging them backward, so that their tracks should deceive their owner. Hercules, however, heard the lowing of the cattle, gripped Cacus to death, and set them free.

THE GOLDEN APPLES

IN a beautiful land in the west of Africa lived some nymphs called the Hesperides. It was their duty to guard the fruit which Mother Earth had presented to the goddess Juno as a bridal gift. A sleepless dragon guarded the plantation where grew the golden apples, and the way that led to it was full of difficulties. After many wanderings and terrible fights with giants and tyrants, Hercules succeeded in catching Nereus, one of the gods of the sea, who changed into all kinds of shapes in his endeavors to escape from the strong hands that gripped him. Finding all his wiles of no avail, he resumed his natural shape and sent Hercules to Atlas, who agreed to take the fruit, on condition that Hercules supported the heavens while he was away.

THE DOG OF THE UNDERWORLD

AT the entrance to Hades, the abode of the dead, there kept guard a three-headed dog named Cerberus, whose duty it was to prevent the living from entering and the dead from escaping out of the shadow-kingdom. Pluto, the dark-visaged king of the Underworld, gave Hercules permission to take the dog up into the light, provided that he did not use weapons. This Hercules, by his mighty strength, succeeded in doing, and he also led it back uninjured. Hercules was then freed from his labors.

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The Book of MEN AND WOMEN



Buddha.



Zoroaster.



Mohammed.



Confucius.

SOME FOUNDERS OF RELIGIONS

MAN in all ages has been puzzled to know why he exists and how this earth came into being. As soon as he began to think he found himself surrounded by mystery. He looked around him, and saw the beauty of the fields, the majesty of the hills, the wonder of great waters; he looked upward, and fixed his gaze upon the uncountable stars; he turned his gaze inward, and saw, as it were in a mirror, himself, his own thought, his reflection of "I am I." What did it all mean? Whence? For what purpose? Whither?

Among those who wondered there were some who meditated and reflected. Their meditations led them to believe certain things. They spoke of these beliefs. If their belief satisfied the ideas of men, they became teachers. They spent their lives in teaching, and at their death others continued to deliver the message.

Who these earliest teachers were and what they taught we shall never know accurately. The earliest religious ideas of the human race are lost in the silence of the past. It is quite late in the history of humanity that we come upon religious teachers whom we can name, and whose teachings are more or less clear to us. But these men, it must be carefully remembered, had inherited a teaching

CONTINUED FROM 2989



which goes back to the remote ages of the human race.

Two of the teachers whom we meet in the past were natives of India—Gautama, the founder of Buddhism, and Vardhamana, the founder of what is called Jainism. In India philosophy, which means "search after truth," deeply occupied men's minds. Life was easy there. People had much time to sit down and think; and some gave themselves up entirely to meditating on the riddle of man's existence. India may be called the cradle of religion—certainly the cradle of dreamy thoughts.

Some five hundred years before the birth of Christ the two men of whom we have spoken were born in India. The religion of that time was Brahmanism. Under it all the population was divided into four "castes." The religion had been developed by the Brahmins, or priests, who placed themselves ahead of all others in caste. This division of people into classes had a lasting influence on the whole history of the country because intermarriage between classes was not permitted. But Brahmanism did not satisfy either Gautama or Vardhamana.

Gautama was the son of an influential man, some say a rajah, or king. He was brought up in a palace, and the world was kept hidden from him

until he married. While he lived in the palace Brahmanism satisfied him. But, alas, his first excursion into the world shattered his beliefs! He saw a broken-down old man, then a sick person, and at last a corpse. These things seemed terrible to his soul. He felt that life was a horror. He sought to escape from it.

Leaving his wife, his newborn babe, his father, his friends, his wealth and his palace, Gautama went out into the wilderness, alone, penniless and homeless, to think about life. He came to the conclusion that all solid and material things are useless and quite unworthy of men's affections, because they have the germ of death in them and will pass away. Nothing is worth while. Everything dies. He accepted the conclusion that man is born on this earth, not once, but many times; and because each time his spirit is filled with foolish and vain desires, the great object of life should be to destroy all desire. When once a man has learned to wish for nothing, absolutely nothing—when his spirit is filled with nothing but a complete willingness to perish—then at death he passes out of the world forever, enters something called Nirvana, which no one but an Asiatic can understand, and is blessed forever by being forever non-existent. He ceases to be. Gautama preached this doctrine and called himself the Buddha, which means "the Enlightened One."

It is the most curious religion in the world—if it can be called a religion at all—this Buddhism of Gautama. At one moment you feel how beautiful it is; at the next you are inclined to laugh at its apparent uselessness.

THE WOMAN WHO LEARNED THE SADNESS OF LIFE FROM THE BUDDHA

Here is a typical story of the Buddha.



The great statue of Buddha at Kamakura, in Japan.

A poor woman came to him one day with a dead child in her arms. She was wild with grief and implored the Buddha to give her medicine which would heal her child. Whatever herbs he needed for this medicine she would fetch him, even if she had to go to the ends of the earth. He told her to fetch a little common mustard seed, saying that it must be brought from a house in which no son, husband, parent or slave had died. The woman went away eagerly to fetch the simple mustard seed.

"Here is mustard seed," everyone said

to her. But when she asked if any had died in that house, the answer was: "Lady, the living are few, but the dead are many."

For a long time she journeyed, and then, seeing the truth of things, namely, that death is common to the race, she left her dead baby and returned.

"Have you the seed?" asked the Buddha.

"My lord," she answered, "the people tell me that the living are few, but the dead are many."

BUDDHA TEACHING HIS PUPILS THE VANITY OF HUMAN DESIRE



This group of lifelike figures is to be seen in a pagoda at Bangkok, the capital of Siam. It represents Buddha, "the Enlightened One," teaching his pupils, each of whom is dressed in the robe of a Buddhist priest, and has his name on a marble tablet affixed to his statue. All pupils are sculptured life-size, while Buddha is greater than life-size.

Then the Buddha taught her the great sadness of life and filled her with the desire no longer to exist. As a matter of fact, the whole teaching of Buddhism in regard to human life is the direct opposite of Christianity.

THE BUDDHIST SEEKS NOTHING; THE CHRISTIAN SEEKS EVERYTHING

The Christian believes in God, the Father, the ruler of the world. The Buddhist religion has no place for God as a ruler of the world. A great scholar has said that Buddhism does not recognize "beings with greater supernatural power than any man is supposed capable of attaining to by virtue, austerity and science." The Buddhist believes in a future life, to be sure, but that life is simply a change. He passes into another form of life, perhaps a beggar or an ox or an unpleasant worm. When this form dies he passes into another. Therefore to take life of any sort is sinful, but it is not a sin against God, but against the very nature of things.

The Buddhist believes that life is a curse rather than a blessing. The greatest hope is not a happier life beyond the grave—for no one can tell into what form he may be born again—but extinction, the end of the being born. To gain this end one must cease to feel desire of any sort, must be indifferent to pleasure or to pain, even to life itself. Only by the suppression of desire of any sort can one find peace.

SOME OTHER TEACHINGS OF THE GREAT BUDDHA

There are certain things which help toward reaching this peace of mind. One should not take the life of any living creature, nor should one lie, steal or become drunk. All of these show desire of some sort. Those who enter the religious life must dress in rags, possess nothing, beg their food from door to door, and eat only one meal a day, and that before midday. Though one should feel love, it should not be for any particular person or any special thing: it must be a general benevolence to all who are not so far advanced toward conquering their impulses.

The practice of certain virtues tend directly toward the attainment of Nirvana. These are almsgiving, purity, patience, courage, contemplation and knowledge. It is said that the Buddha himself, in one of his forms, gave his body to feed a hungry tigress and her cubs.

This is not all of Buddhism. In fact, few Western people can understand just what Buddhism teaches. I think you will agree that it is a very difficult religion to understand. Yet millions of people find satisfaction in it.

Buddhism spread among the peoples of India, and at the death of the Buddha it spread still more. Its progress was checked, however, among the northern peoples, who believe in opposing themselves to nature and refuse to resign themselves to fate. It is a purely Eastern religion, lacking altogether a universal note. A recent estimate places the number of Buddhists in the world at 135,161,000.

A TEACHER OF HOPE WHO FOLLOWED THE TEACHER OF DESPAIR

Vardhamana did not like the Buddha's teaching and taught a very different religion. Vardhamana, we may think, was a truer teacher than the Buddha, but unfortunately he did not possess the same genius, the same attractiveness, as the other. His converts were fewer. In the midst of much unintelligible stuff about Nirvana, Vardhamana taught that everything has a soul, the soul being the "life"—so that grass, trees, animals, even water, have souls.

It is the fate of this soul to journey from body to body for millions of years, and the only escape from the toil of existence lies in practicing four virtues—liberality, gentleness, piety and repentance. One must be good in word, thought and deed; kindness to animals is essential. So we see that Jainism is better than Buddhism because it makes for action instead of for despair and resignation; but the goal appears to be the same—an escape from life. Christ, on the other hand, created in men a passionate desire for life—life, and ever more life; life which fulfills itself in adoration of God, who wishes all His children to be happy. Nothing is known of Vardhamana, but the Jains still exist.

A GREAT CHINESE TEACHER AND THE CURIOUS LEGEND OF HIS BIRTH

Curiously enough, about a century before the existence of these two teachers in India there lived two teachers at one and the same time in China. The one was Lao-tsze, who founded what is called Taoism; the other K'ung-Fu-Tse, whom we call by his Latin name Confucius, was the founder of Chinese philosophy.

LAO-TSZE GOES INTO THE WILDERNESS



The warden asks Lao-tsze to write him a book before he goes into the wilderness.

The meaning of the title Lao-tsze is nothing more nor less than "Old Boy," and legend has it that he was born in a miraculous way. He was no less than eighty years old at the time of his birth, and his head was covered with white hair. A venerable beard descended from his chin. But a more appropriate translation of Lao-tsze is "the Venerable Philosopher." Of course the story of his birth is simply a legend.

He was born in a hamlet, and became librarian to the king. In the royal library he pondered over the mysteries of life, and after many years he came to the conclusion that the great thing, the supreme virtue, was humility. Desiring to hide himself, he left the palace and set out for the wilderness. As he was passing through the gate the warden, who knew him for a holy man, said: "You are about to withdraw yourself from the world. I pray you write me a book before you go."

Lao-tsze thereupon sat down and wrote a book about half the size of St. Mark's Gospel. He gave this to the warden, passed through the gate, and no man knows where he died.

HOW LAO-TSZE WROTE A GOSPEL AND TAUGHT MEN NOT TO BE ANXIOUS

The little book is the gospel of Taoism. From those few pages grew up an immense religion. If Lao-tsze could stand in that gate now he would be amazed to see the effect of his farewell to the warden. Let us see how much we can understand of Taoism.

The word "Tao" is the despair of translators. It means "the way," but it means "the wayfarer" as well. It is man and his destiny; God and humanity. We cannot say exactly what a Chinese understands by it. Lao-tsze's advice is that we should think and act without reflection. We should become like young children. The grass grows without taking thought: man should live with a similar freedom from anxiety. Everything should be spontaneous and should be done on the impulse. But he carries this advice almost to the point of anarchy. "It is the way of Tao," he says, "not to act from any personal motive, to conduct affairs without feeling the trouble of them, to eat without being aware of the flavor, to account the great as small and the small as great, to recompense injury with kindness."

He hated war; he did not like to see

men put to death. He felt no interest in art, culture and refinement. Life should be without effort. There could be no beauty where there was strain. The pilgrim of existence should never be in haste about anything, never be anxious.

We see that, unlike the two teachers of India, this old philosopher wanted people to be happy; but we cannot help feeling that here also is that despairing fatalism—the belief that everything is prearranged to happen, whatever man may do—which is the ruling idea of the East, as distinct from the West.

THE BOY WHO PLAYED AT PREACHING AND BECAME THE SAGE OF CHINA

A very different man is Confucius, the great sage of China. Confucius and Lao-tsze once had a conversation. Lao-tsze did not think much of Confucius: Confucius admired Lao-tsze. Which was the greater man? Confucius: it requires genius of the highest order to appreciate those with whom we do not agree. Confucius was born of an ancient and honorable family, but he was poor. In order to earn his living he studied hard in childhood. He was fond of music and played on the lute, singing to it. His favorite game with other children was what we should call "playing at being a clergyman." He liked to dress himself up, to strike attitudes and to conduct religious sacrifices. He was married at nineteen, and became a keeper of stores and later the controller of parks and herds.

He was twenty-two when he set up as a teacher, and it is said of him that he never refused a scholar who was too poor to pay his fees. But he used to say that when he had explained one corner of any subject, if the pupil could not understand the other three corners for himself, he gave up teaching that lesson.

His fame spread as a teacher, and he became a minister to one of the rulers. So great was his success that he became "the idol of the people, and flew in songs through their mouths." He put down injustice and banished crime. He was just, honest, fearless and good. But the ruler began to grow jealous of his power, and Confucius had to go.

The rest of his life is a pathetic tale of homeless wanderings. Accompanied by his disciples, he journeyed from state to state seeking some ruler wise enough to accept him as teacher and minister.

MOHAMMED DICTATING THE KORAN



Every Mohammedan reverences the sacred scriptures of his religion called the Koran, a word that means "book," just as our word Bible does. Mohammed said that the chapters of the Koran were brought to him from heaven by the angel Gabriel, and to confirm this he pointed out that he himself could neither read nor write. The general opinion is that he dictated the Koran.

He told his disciples that the greatest reform was to make people understand the meanings of such names as "ruler," "father," "son." If those words were properly understood, unhappiness and misery would vanish from the earth.

**HOW THE TEACHER OF CHINA SOUGHT
A KINGDOM BUT FOUND NONE**

On these wanderings he frequently encountered hermits—men who had retired from the world in disgust. These hermits could not understand how Confucius could be so stupid as to live in a wicked world trying to alter what was unalterable. Confucius said it was impossible to withdraw from men and live with beasts and birds who did not understand man. "With whom should I associate," he asked finely, "but with suffering man?" So he walked on and on, teaching his disciples, comforting the poor, and seeking for a kingdom to rule.

He found no kingdom. But his teachings have lived from the day of those sad wanderings down to our own time, and Confucius now reigns as no other emperor can reign in the hearts of millions and millions of the human race.

One of his sayings shows the great difference between him and Lao-tsze: "The cautious seldom err." But his whole gospel was more generous than that. He taught the golden rule that we should live exactly as we would have others live: "What you do not like when done to yourself, do not to others." His whole teaching shows that we should do good to others, whether there is need for us to do so or not. But he said nothing chivalrous or noble about women, and he gave no attention to a life after death. "While you do not know life," he said, "what can you know about death?" All his ideas of goodness concerned man's life on this earth. It is wonderful that a teacher who left wholly out of account life after death should have had, and still does have, such immense influence over men. There are about 301,155,000 Confucianists and Taoists in the world.

**THE PROPHET OF PERSIA WHO LAUGHED
THE DAY HE WAS BORN**

Farther back in time than any of these men is the founder of Zoroastrianism, the ancient religion of Persia. Some say he lived before the battle of Troy; others say he was really Ezekiel, and others that he was Ham, Moses or Abraham. There is no end to the theories about

Zoroaster. The legends about him are also legion. It is said that he began to laugh the day he was born; that the palpitation of his brain was so vigorous that it repelled any hand that might be put upon his head; that he dwelt twenty years in the wilderness and lived upon a single cheese which never grew stale. It is also said that as he came down from meditation on a mountain, fire burst out from heaven which did not consume him; that he desired to be killed by a thunderbolt, and that in this manner he did die, after having taught the Persians all there is to know about this world and the next. Followers of Zoroaster believe these stories and use them to preach from.

We need not trouble our heads about this enormous nonsense, which always grows up about the original thinkers of antiquity. We may be certain that a man named Zoroaster did live, that he taught the Magi, or wise men, of Persia, and that his character was sufficiently unusual to make him revered and honored and obeyed by his disciples.

**THE GOOD GOD OF THE LIGHT AND
THE EVIL GOD OF THE DARKNESS**

Zoroaster divided everything into good and evil. There was a good god and an evil god. Some of the animals, birds, fishes and plants are made by the good god and some by the evil god. He taught that sacrifices should be made to the good god in order to win from him all manner of good things; and to the evil god also, that he might guard the offerers from dangerous, hurtful and unpleasant things. Light belongs to the good god, and darkness to the bad. The name of the good god is Ormuzd, and that of the evil god, Ahriman. Life after death will be either good or evil, and the whole of our eternal life is determined by our existence here. The soul after death passes over the Accountant's Bridge; its deeds are examined in the book where everything is written; if there are more good than evil deeds, it goes straight to bliss; if the other, it goes straight to pain; and if the balance is equal, it waits in a land of shadow for the final decision of the Great Judge.

You will see that there is some sense and some beauty mixed up in this otherwise absurd religion, which is interesting as showing us what men have accomplished in striving to solve the great and perplexing riddle of existence.

TEMPLES OF THE EAST



THE WONDERFUL HINDU TEMPLE AT MADURA, IN INDIA, DECORATED WITH
HUNDREDS OF CARVED FIGURES



THE ANCIENT HONAM
PAGODA NEAR CANTON



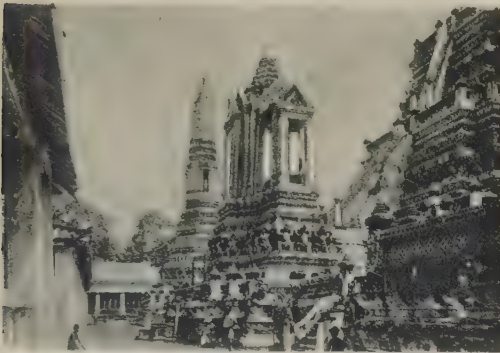
A MODERN TEMPLE AT KADO,
IN BURMA



SOO CHOW PAGODA, BUILT
1,600 YEARS AGO



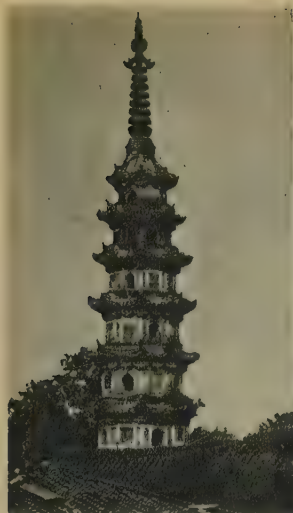
THE SPLENDID TEMPLES AT KAPURTHALA, INDIA



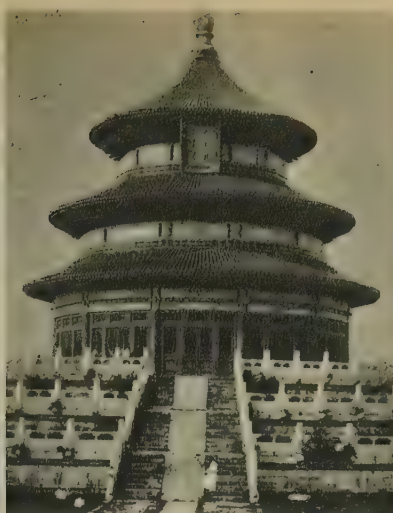
THE TEMPLE OF WAT CHENG, SIAM



MINOBU TEMPLE, JAPAN



A PAGODA AT SOO CHOW,
IN CHINA



THE TEMPLE OF HEAVEN
AT PEKING



THE TIGER HILL PAGODA
IN CHINA



THE GORGEOUS MOSQUE OF SHAH ZADE AT CONSTANTINOPLE



A JAIN TEMPLE ON MOUNT
ABU IN INDIA



THE TEMPLE OF NAGARCOILL, NEAR
CAPE COMORIN, IN INDIA



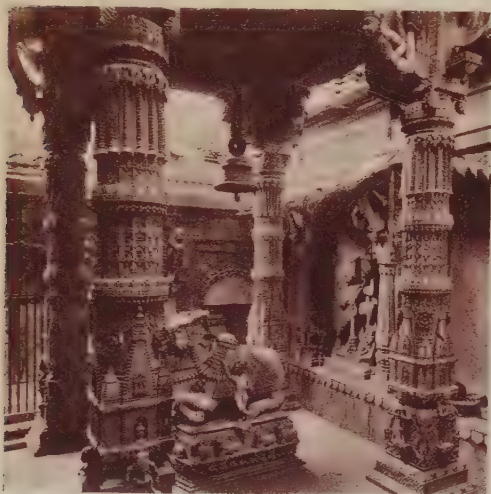
A JAIN TEMPLE IN
CALCUTTA



A FIGURE OF BUDDHA IN BUDDH-
GAYA TEMPLE, INDIA



THE MOSQUE OF RANEE
SEPREE AT AHMEDABAD



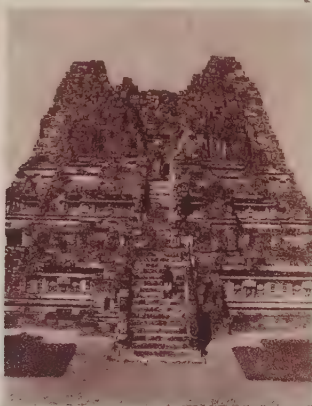
THE RICHLY CARVED INTERIOR OF THE
GOSAIN TEMPLE IN BENARES



THE HIGHLY DECORATED COLUMNS OF A
JAIN TEMPLE IN UDAIPUR, INDIA



THE APPROACH TO SHWE DAGON
PAGODA AT RANGOON



BORO BUDUR, THE ANCIENT
BUDDHIST TEMPLE IN JAVA



THE PEARL MOSQUE AT
AGRA, IN INDIA

The pictures on these pages are by Bourne & Shepherd, E.N.A., Herbert G. Penting, Lowell Thomas, Underwood & Underwood, and others.

**THE ORPHAN BOY WHO BECAME A
PROPHET TO MILLIONS OF MEN**

And now, last of all, we come to the most recent of religious founders—Mohammed, who is the prophet to millions of the human race and who has sometimes been compared with Christ. The truth is that Mohammed probably knew not only the Old Testament but also the teachings of Christ. Some people have been rash enough to say that Mohammedanism was Mohammed's effort to rescue the teaching of Jesus from the confusion into which it had been brought by the Christian Church.

Mohammed was born of poor parents at Mecca toward the end of the sixth century. Left an orphan early, he was brought up by an uncle. He was a good boy. At a marriageable age he was sent to act as master of the camels of an elderly woman who traded in Syria. This woman fell in love with her young servant and married him. At forty years of age he was the father of a family, with married daughters.

The Koran, the scriptures of Mohammedanism, is a wonderful book. The Mohammedans teach that Mohammed was inspired by the angel Gabriel to dictate it or have it written. In it there are fables the most monstrous and horrible; but in it, too, there are occasional aspirations toward immortality and expressions of repentance which are beautiful.

**THE ARAB MERCHANT WHO CHANGED
THE LIFE OF MILLIONS**

One thing distinguished this Arab merchant from all his fellow-countrymen. He had a deep and burning consciousness of the majesty of God. In his travels he encountered men of all races, heard what they said, saw how they behaved, and pondered on the conflicts between the religions of mankind. Then, as he sat on his camel's back and rode through "the starlit Arabian waste," he would turn his thoughts on all he had heard and seen. Turning those thoughts over and over in his mind, he tried to worry out a way to the true religion. There must be, he felt, one true religion—true for men of all races, essential for the happiness of mankind. It came to him that this true religion could be uttered in a single phrase: There is one God. He looked upon the God of the Jews as a tribal god, but Mohammed's god was to be the God of all mankind.

The Arabs believed in magic and worshiped many gods, and in those days they were densely ignorant of science and learning. Their country lay far from the path of the great civilizations which long ago had risen and fallen. Therefore, when Mohammed began to speak about the One God there were many of his race who regarded him as a renegade. For years only a handful of people would listen to him. Quietly and intensely he spoke of this great matter to his household and his friends, and after some years he was sufficiently formidable to arouse opposition. Then he had to fly from Mecca.

We must not judge him by any of our standards. He was an Arab. His world was utterly unlike our world. His thoughts were altogether different from our thoughts. In that wild and restless mind, set on fire by the thought that God was speaking to him, stirred all the passions of his Arab nature. It was not for him to submit to his enemies. It was not in his character to go calmly to a martyr's death. On the contrary, to be faithful to God he must be ready to fight for God. Those who opposed him opposed God; they were enemies to be slain by the sword.

So it came about that the religion of Mohammed took the sword, and by the sword propagated itself in Arabia. Mohammed was growing old; before God should call him he must leave this true religion firmly established. How could he do this unless he overthrew the enemies of his faith?

But it was not by the sword that he got his victory. Mohammed's preaching drew men to his side. Something in the hearts of those wild Arabs responded with gladness when he denounced idol-worship and spoke of the invisible God of all mankind. He never uttered anything beautiful or tender—nothing that a scholar of Europe would call sublime. His teaching was stern, vigorous and uncompromising; and the Arabs heard him gladly.

After his death, in 632, thousands of Arabs acclaimed him the Prophet of God, and felt that life for them lay in one thing only—the spreading of his teaching. To them there was no other method of doing this but by the sword. They became a military power. Under their Caliph Omar, who lived at Medina, they swept through Syria, Palestine, Phœnicia,

Persia and Egypt, shouting their war-cry of "There is one God, and Mohammed is his Prophet," flashing their swords in the air, carrying all things before them.

We see the idea of a solitary deep-thinking man spreading swiftly across the earth. It had come to him in a country far from the civilizations of mankind, and a country which civilization could hardly touch. Carlyle has described in vivid touch the home of the Arab race:

Savage, inaccessible rock-mountains, great, grim deserts, alternating with beautiful strips of verdure; wherever water is, there is greenness, beauty; odoriferous balm shrubs, date trees, frankincense trees. Consider that wide-waste horizon of sand, empty, silent, like a sand sea, dividing habitable place from habitable.

You are all alone there, left alone with the universe; by day a fierce sun blazing down on it with intolerable radiance; by night the great deep heaven with its stars.

THE THOUGHT OF MOHAMMED TAKES POSSESSION OF THE ARAB RACE

It is plain to us that an idea entering the mind of man in such a setting as this would lay firm hold on his life. No distractions in that "wide-waste horizon of sand" would call his attention from the one thought burning in his soul as the one sun was burning in the sky. No enticements of civilized cities would beguile him into wondering whether this idea of his was really true. No scholar would bid him pause to think it out well before he took action to make other men share it with him—this huge idea towering up in this soul to the very magnitude of God. No; he would live in unbroken communion with this idea till it mastered him, till he became its slave, till it became himself.

So to the Arab came the thought of Mohammed that there is one God. And in that vast desert this solitary thought took possession of the whole Arab race, finally breaking over those inaccessible rock-mountains, flowing over those great grim deserts and flooding far away into Eastern lands. Then it turned like an ocean tide and flooded westward as if it would submerge the lands of struggling Christianity.

Descendants of many Eastern races flocked to the standard of Mohammed, calling themselves Moors. They conquered great territories in Africa, and crossing the sea, advanced into Europe as far as Spain.

THE TERRIBLE THING THAT HATE HAS DONE FOR MANKIND

For centuries Christians were taught to regard these Moors with detestation. Thus it came about that a hatred which has not even now ceased to sunder East from West grew up in the hearts of men. The Mohammedans called the Christians "infidels," while the Christians called the Mohammedans "heathens."

Now see what this hate has done for mankind. It has caused the death and mutilation of millions of human beings: it has wasted human life. Civilization was held back by it, prevented by it from advancing the happiness of all the world. Knowledge has been pushed aside that men might arm themselves with swords and march backward and forward burning, killing, laying waste and destroying, all in the name of God! It is only within recent years that this warfare has ceased. It is acknowledged now that Islam, as Mohammed's religion is called, rescued many millions of men from a shameful idolatry and gave them the nobler idea of One God. The number of Mohammedans in all countries to-day is 219,030,000.

GOOD AND BAD THINGS IN THE TEACHING OF MOHAMMED

Mohammed himself taught that Jesus was a prophet from God, and many of the beautiful thoughts of Jesus passed into his mind and became a part of his religion. For instance, he taught compassion; he taught that masters were to feed and clothe their slaves as they themselves were fed and clothed. He taught that in the sight of God all men are equal, and, like Jesus, he taught that prayer is simply communion of the soul with God.

Yet there were things in his teaching which tended to hold back the spirit of man. For example, he regarded women as little more than slaves. He did not see that humanity can never rise to the heights of its destiny until women are venerated and set on equality with men. But these teachings of Islam are even now yielding to Western influences. They might have vanished hundreds of years ago but for the gospel of hate preached with the sword by Moor and Christian, too. Contact with Western education is bringing a new viewpoint to the leaders of the chief Mohammedan races.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 3193.



WHY DO I DREAM?

THE brain has many parts, and some parts of it may be asleep while another part is awake and active. That is what happens when we dream.

Most of the brain, especially the highest part of it, is asleep in a dream, but parts of it are awake. These, unguided by the highest powers of the mind, work on the experiences we have had, especially recent happenings. Perhaps only the very deepest sleep is entirely free from dreams, and it seems certain that most of us have dreams of which we remember nothing when we wake.

The more vague and shadowy and the more easily forgotten a dream is, the fewer are the parts of the brain that have been awake; but when we have long and complete dreams, very clear, and very clearly remembered, then it is probable that more of the brain has been awake. The fewer dreams we have, the better, for that means that our sleep has been more complete; and if we are to have dreams, it is best to have the kind which are scarcely remembered. *No dream has any meaning about the future.*

By far the worst kind of dream is a nightmare—a dream which seems very real, and is horrible or frightening. When nightmares occur often they should be attended to. In some people they are due to heart disease, which

CONTINUED FROM 3016



prevents the supply of blood to the brain from being evenly maintained. But, as a rule, a nightmare has its origin in the stomach, and it is disagreeable because it is aroused by disagreeable sensations there.

By far the most common of all these causes is indigestion, and everyone who is liable to nightmares should be very careful about what he eats before going to bed. On no account should such a person take a heavy meal less than three hours before going to bed. Besides the unpleasantness of nightmares, we should remember that they mean that the sleeper is not getting sleep of the best quality, and his waking hours will suffer accordingly.

Sometimes we seem to do quite impossible things when we dream, and are never surprised at doing them. The reason is that in a dream the very highest part of our brain, the part which has to do with our knowledge of ourselves, with judgment, and with the power of distinguishing between what is real and what is only fancied, is asleep, and so unable to do its work. When we are awake we may often build "castles in the air," or imagine ourselves doing all sorts of wonderful things; but the highest part of the brain remains active, so that all the time we know we are only imagining these things.

WHY DOES FURNITURE MAKE A NOISE AT NIGHT?

Perhaps we cannot be quite certain that furniture cracks so much more at night than in the daytime.

For one thing, there are other noises going on in the daytime which we are more likely to be hearing; for another, it is known that when we lie awake at night in the dark, our hearing is more acute than it usually is in the daytime. Still, when all this is allowed for, it is no doubt true that furniture does make strange noises at night, and that is not difficult to understand if we remember that the air has been warmed up, more or less, during the day, and then cools down again during the night.

The general rule, which is true of wood as it is of most other things, is that things expand as they are heated and shrink as they are cooled. Thus furniture is liable to shrink more or less at night as it cools, and we can understand how different parts may suddenly slip a little and so start the waves in the air which make us say that the furniture is cracking.

The question of moisture may play a part, too, because as air cools it is apt to deposit the moisture which it could hold in itself when it was hotter, and that moisture is apt to affect the state of whatever object it is deposited upon.

WHY HAVE WE TWO EYES?

Sometimes we may have noticed that people, in pouring milk or putting a lump of sugar into a tea-cup, have made a mistake, and put the milk and sugar in the saucer. That is what is very likely to happen to anyone who uses only one eye.

The two eyes do not look at anything from exactly the same place, but from rather different "points of view," as we say. The brain takes these two points of view and sees from both of them together; so that it is very much helped in judging distance by the difference between the two images of a thing seen by the two eyes.

It is because we have two eyes that we see things in their relation in front of or behind each other. An ordinary photograph looks flat, because, so to say, the camera saw it with only one eye. But if we take two photographs of a thing, from two points of view corresponding to the distance between the two eyes, and then put the two photographs side by side at the right distance, and look at

them with both eyes, through the simple little instrument called a stereoscope, or "solid see-er," then we see the view as if it were solid, or see it "in relief," as people say. We see it as we should have seen the thing itself if we had looked at it with our own two eyes.

HOW IS IT THAT FISHES ARE NOT SALT WHEN CAUGHT?

The part of the fish that we judge by is its muscles, which form its flesh, and which we eat. Though the fish lives in salt water, it takes into its blood only what it requires for the purpose of its life. This is an important thing which we must remember.

If we look at it in this way, we shall understand how it is that the saltiness of a fish's muscles is not very different from that of a chicken's muscles. When we study the whole animal world, we find that the proportions of salt required in the water or in the blood that we find in the bodies of many different creatures are very much the same. The cells that make up muscles are very much the same in their way of living and their needs, whether we find them in a bird, a fish, an ox or ourselves.

Thus we should not expect to find the flesh of the fish saltier than that of another creature, nor to find that it makes any particular difference whether the fish is a salt-water fish or a fresh-water fish. We must remember that the fish, like ourselves, has the power of choosing from the things which it swallows just those things which it needs for its life, and of taking them, and them only, into its blood.

WHERE DOES PUMICE-STONE COME FROM?

We think of pumice-stone as merely something that rubs our skin so hard that it will take out inkstains, but it has a wonderful history. The word is really from a Latin word which means foam, and we can see for ourselves that this stone is very light and spongy, so that it is almost like foam. It is spongy and full of spaces because it was formed under the influence of intense heat, and the spaces in it were filled with gas when it was made.

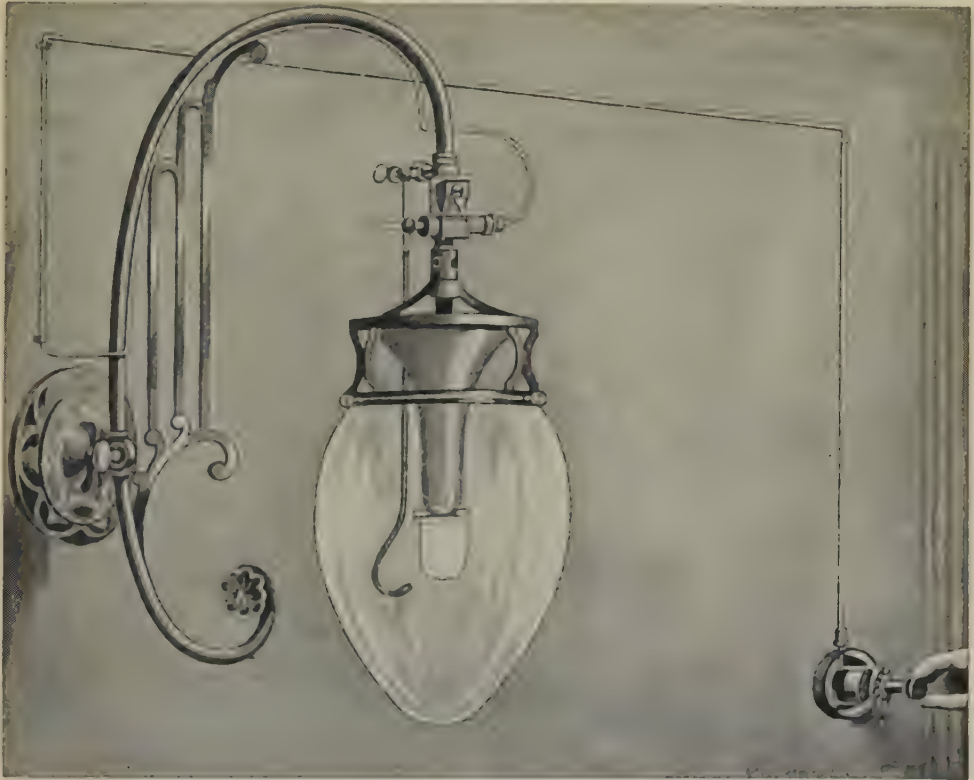
Pumice-stone is really volcanic rock, formed deep in the earth and thrown out upon the surface from the crater of a volcano. It has a particular value for our knowledge of the earth in that its composition tells us something of the deeper part of the earth's crust.

WHY IS A SNOWFLAKE LIGHTER THAN A RAINDROP?

A snowflake is made of ice-crystals—that is to say, of solid water. Now, it is a most important and peculiar fact about water that ice is lighter than liquid water, even though it is colder. The general rule, of course, is that things get heavier as they get cooler and lighter as they get hotter, as heat expands them and cold contracts them. But at just near its freezing-point

WHY IS IT HOTTER AT THE EQUATOR THAN IN MAINE?

We know that the Equator is the name given to the great line that we imagine to run round the middle of the earth. Of course, there is no real line, except on the maps and globes. The belts, or zones, of the earth on both sides of the Equator are called the tropic zones, and are the hottest parts of the earth's surface. The reason is that, no matter whether it is summer or



HOW AIR TURNS THE GAS ON

This picture-diagram shows the working of a pneumatic gas switch, which we see sometimes in houses. When the knob on the wall is pulled out, air is drawn down the tube, and sucks inward a piston at the other end. This piston draws over to the right a small lever, which turns on the gas to be ignited by the by-pass. Pressing in the knob forces back the air, the piston and the lever to their original position, shown in the dotted lines, thus cutting off the gas.

water does not obey this rule; it expands as it gets cooler and freezes. That is why it sometimes bursts pipes in winter if they are unprotected from the frost.

So a snowflake is made of water in a lighter state than the water in a raindrop; and yet another reason why the snowflake is lighter is, that there is a great deal of air in among the ice-crystals. This makes the whole thing lighter, just as the air in the bones of a bird makes them lighter and therefore assists flight.

winter, farther north or farther south, in the temperate zones—in one of which Maine is—the tropic zones are always very directly exposed to the sun's rays, which strike down more vertically. For the sun rises very high up into the top of the sky in the tropical regions, and so it is always very hot there. But it is too hot for human life at its best, and the greatest achievements of man with hand or brain have been made on one side or other of the tropical region.

**DOES A ROCK
BREATHE?**

At first sight, this seems to be rather an absurd question, because we always associate breathing with living creatures, and rocks are certainly not alive in the ordinary sense of the word. It really depends on what we mean by the word breathe. Rocks do not have lungs; they do not take in oxygen, then give out carbon dioxide, as we do; but if by breathe we simply mean take in oxygen, then the answer to the question is yes. Long ages ago the rocks took in huge amounts of oxygen when they were being formed. It is reckoned that there is as much oxygen contained in a layer of rocks a few feet deep as in the air above them.

This process of the intake of oxygen from the air by rocks still goes on in some degree, and it helps in part to explain why many kinds of rocks crumble and break down and wear away from year to year, especially when we take the wearing action of rain and wind into account as well.

**WHAT MAKES THE SEA
ROAR?**

Roaring is a kind of sound, and though sound is something that can travel in all kinds of matter, it is usually, as we know it, a wave in the air, because, as a rule, our ears are not pressed up against any solid thing, nor are they under water, and so all sounds that reach them must reach them through the air. This is true when we hear the sea roaring; though a swimmer, when he goes head first through a wave, may hear a roaring coming through the water when he is below the surface. Everywhere the surface of the water is in contact with the air, and if the water moves violently, it may start in the air those waves which our ears can hear and which we call sound.

These waves are of the kind that are not very numerous in each second, and so they make sounds of low pitch, which we call roaring. Sometimes, when a wave breaks, a great volume of water may fall upon the rest of the water, and so make a sound which is more like an explosion than a roar.

Tennyson wrote once about what he called "the scream of the maddened beach"; and it is very interesting to notice that we do hear on the beach sounds that are much more like a scream than like a roar, though the sea itself never screams. It is the beach, and not the water directly,

that makes the scream, and the kind of scream will depend on the kind of beach. Soft sand will not scream, but where there are pebbles of certain kinds, as the waves move up and down they rub the pebbles against each other, and that produces air-waves of a quicker rate, which may be likened to a scream.

**WHY DO THE HILLS LOOK BLUE
AT A DISTANCE?**

The blueness of the sky is due partly to reflection of the blue rays of sunlight from dust particles in the air, and partly, as Lord Rayleigh showed, to the blue color of the nitrogen gas in the air.

Now, if we look through a layer of anything that is colored at something beyond it, the layer will contribute its own color to the color we see. The blueness of the air, however, is a very faint blue, and we do not usually notice the blueness it contributes to anything near. But when we look at distant hills, we are looking through such a thick layer of air that it gives them a blue tinge. But the actual color which we see depends upon many other things, as, for instance, the color of the hills themselves, and the time of day—which decides the angle at which the sunlight falls upon the hills and also affects the color of the sunlight. That is enough to explain why the color of hills changes from moment to moment.

**WHAT IS THE CAUSE OF A
QUICKSAND?**

Quick is an old word which means living, or moving. These words, living and moving, meant practically the same thing long ago. A quicksand is a bank of sand in water; perhaps in the sea, or a lake, or a river, or we may even meet a quicksand when we dig in the earth. The sand moves with the water around or in it, and thus a person or a boat that is caught in such a sand may be drawn down into it, as the water and some of the sand sinks.

The famous Goodwin Sands in the English Channel, once an island, may be quite firm in parts for hours, but when covered by the sea they shift and become quicksands. In this state they are dangerous to vessels. The weight of the moving sand is tremendous. We must not think of it as sticky. It is the weight and the movement that give it its terrible power. Two hundred years ago thirteen warships were lost in one night in these treacherous quicksands.

THE NEXT WONDER QUESTIONS ARE ON PAGE 3225.

The Book of POETRY

CHRISTINA ROSSETTI'S FAMOUS POEM

CHISTINA GEORGINA ROSSETTI, a famous poet and a sister of the more famous Dante Gabriel Rossetti, poet and painter, was born on December 5, 1830, in London, and died there, December 29, 1894. *Goblin Market*, published in 1862, was her first long poem, and many attempts have been made to explain its "inner meaning." But it is simply a charming fairy fancy and has no inner meaning. Among her books of verse there is one for little folk, *Sing Song*.

CONTINUED FROM 3008

GOBLIN MARKET

MORNING and evening

Maids heard the goblins cry

"Come buy our orchard fruits

Come buy, come buy:

Apples and quinces,

Lemons and oranges,

Plump unpecked cherries,

Melons and raspberries,

Bloom-down-cheeked peaches,

Swart-headed mulberries,

Wild free-born cranberries,

Crab-apples, dewberries,

Pine-apples, blackberries,

Apricots, strawberries;—

All ripe together

In summer weather,—

Morns that pass by,

Fair eves that fly;

Come buy, come buy;

Our grapes fresh from the vine,

Pomegranates full and fine,

Dates and sharp bullaces,

Rare pears and greengages,

Damsons and bilberries,

Taste them and try:

Currants and gooseberries,

Bright-fire-like barberries,

Figs to fill your mouth,

Citrons from the South,

Sweet to tongue and sound to eye;

Come buy, come buy."

Evening by evening

Among the brookside rushes,

Laura bowed her head to hear,

Lizzie veiled her blushes;

Crouching close together

In the cooling weather,

With clasping arms and cautioning lips,

With tingling cheeks and finger tips,

"Lie close," Laura said,

Pricking up her golden head:

"We must not look at goblin men,

We must not buy their fruits;

Who knows upon what soil they fed

Their hungry thirsty roots?"

"Come buy," call the goblins,

Hobbling down the glen.

"Oh," cried Lizzie, "Laura, Laura,

You should not peep at goblin men!"

Lizzie covered up her eyes,

Covered close lest they should look;

Laura reared her glossy head,

And whispered like the restless brook:

"Look, Lizzie, look, Lizzie,

Down the glen tramp little men.

One hauls a basket,

One bears a plate,

One lugs a golden dish

Of many pounds weight.

How fair the vine must grow

Whose grapes are so luscious;

How warm the wind must blow

Through those fruit bushes."

"No," said Lizzie: "No, no, no;

Their offers should not charm us,

Their evil gifts would harm us."

She thrust a dimpled finger

In each ear, shut eyes and ran:

Curious Laura chose to linger

Wondering at each merchant man.

One had a cat's face,

One whisked a tail,

One tramped at a rat's pace,

One crawled like a snail,

One like a wombat prowled obtuse and furry,

One like a ratel tumbled hurry skurry.

She heard a voice like voice of doves

Cooing all together:

They sounded kind and full of loves

In the pleasant weather.

Laura stretched her gleaming neck

Like a rush-imbedded swan,

Like a lily from the beck,

Like a moonlit poplar branch,

Like a vessel at the launch

When its last restraint is gone.

Backwards up the mossy glen

Turned and trooped the goblin men

With their shrill repeated cry:

"Come buy, come buy."

When they reached where Laura was

They stood stock still upon the moss,

Leering at each other,

Brother with queer brother;

Signalling each other,

Brother with sly brother.

One set his basket down,

One reared his plate;

One began to weave a crown

Of tendrils, leaves, and rough nuts brown

(Men sell not such in any town);

One heaved the golden weight

Of dish and fruit to offer her:

"Come buy, come buy," was still their cry.

Laura stared, but did not stir,

Longed but had no money;

The whisk-tailed merchant bade her taste

In tones as smooth as honey,

The cat-faced purred,

The rat-paced spoke a word

Of welcome, and the snail-paced even
was heard;
One parrot-voiced and jolly
Cried "Pretty Goblin" still for "Pretty
Polly";—
One whistled like a bird.

But sweet-tooth Laura spoke in haste,
"Good Folk, I have no coin;
To take were to purloin;
I have no copper in my purse,
I have no silver either,
And all my gold is on the furze
That shakes in windy weather
Above the rusty heather."
"You have much gold upon your head,"
They answered all together:
"Buy from us with a golden curl."
She clipped a precious golden lock,
Then dropped a tear more rare than pearl,
Then sucked their fruit globes fair or red:
Sweeter than honey from the rock,
Stronger than man-rejoicing wine,
Clearer than water flowed that juice;
She never tasted such before,
How should it cloy with length of use?
She sucked and sucked and sucked the more
Fruits which that unknown orchard bore;
She sucked until her lips were sore;
Then flung the emptied rinds away,
But gathered up one kernel-stone,
And knew not was it night or day
As she turned home alone.

Lizzie met her at the gate
Full of wise upbraidings:
"Dear, you should not stay so late,
Twilight is not good for maidens;
Should not loiter in the glen
In the haunts of goblin men.
Do you not remember Jeanie,
How she met them in the moonlight,
Took their gifts both choice and many,
Ate their fruits and wore their flowers
Plucked from bowers
Where summer ripens at all hours?
But ever in the moonlight
She pined and pined away;
Sought them by night and day,
Found them no more, but dwindled
and grew grey;
Then fell with the first snow,
While to this day no grass will grow
Where she lies low;
I planted daisies there a year ago
That never blow.
You should not loiter so."
"Nay, hush," said Laura:
"Nay, hush, my sister:
I ate and ate my fill,
Yet my mouth waters still;
To-morrow night I will
Buy more"; and kissed her:
"Have done with sorrow;
I'll bring you plums to-morrow
Fresh on their mother twigs,
Cherries worth getting;
You cannot think what figs
My teeth have met in,
What melons icy-cold,
Piled on a dish of gold
Too huge for me to hold,

What peaches with a velvet nap,
Pellucid grapes without one seed:
Odorous indeed must be the mead
Whereon they grow, and pure the wave
they drink
With lilies at the brink,
And sugar-sweet their sap."

Golden head by golden head,
Like two pigeons in one nest
Folded in each other's wings,
They lay down in their curtained bed:
Like two blossoms on one stem,
Like two flakes of new-fall'n snow,
Like two wands of ivory
Tipped with gold for awful kings.
Moon and stars gazed in at them,
Wind sang to them lullaby,
Lumbering owls forbore to fly,
Not a bat flapped to and fro
Round their rest:
Cheek to cheek and breast to breast
Locked together in one nest.

Early in the morning
When the first cock crowd his warning,
Neat like bees, as sweet and busy,
Laura rose with Lizzie:
Fetched in honey, milked the cows,
Aired and set to rights the house,
Kneaded cakes of whitest wheat,
Cakes for dainty mouths to eat,
Next churned butter, whipped up cream,
Fed their poultry, sat and sewed;
Talked as modest maidens should:
Lizzie with an open heart,
Laura in an absent dream,
One content, one sick in part;
One warbling for the mere bright day's
delight,
One longing for the night.

At length slow evening came:
They went with pitchers to the reedy brook;
Lizzie most placid in her look,
Laura most like a leaping flame.
They drew the gurgling water from its deep;
Lizzie plucked purple and rich golden flags,
Then turning homeward said: "The sunset
flushes

Those furthest loftiest crags;
Come, Laura, not another maiden lags,
No wilful squirrel wags,
The beasts and birds are fast asleep."
But Laura loitered still among the rushes
And said the bank was steep.

And said the hour was early still,
The dew not fall'n, the wind not chill;
Listening ever, but not catching
The customary cry,
"Come buy, come buy,"
With its iterated jingle
Of sugar-baited words:
Not for all her watching
Once discerning even one goblin
Racing, whisking, tumbling, hobbling;
Let alone the herds
That used to tramp along the glen,
In groups or single,
Of brisk fruit-merchant
men.



Till Lizzie urged: "O Laura, come;
I hear the fruit-call, but I dare not look!
You should not loiter longer at this brook:
Come with me home.
The stars rise, the moon bends her arc,
Each glowworm winks her spark,
Let us get home before the night grows dark;
For clouds may gather
Though this is summer weather,
Put out the lights and drench us through;
Then if we lost our way what should we do?"

Laura turned cold as stone
To find her sister heard that cry alone,
That goblin cry,
"Come buy our fruits, come buy."
Must she then buy no more such dainty fruit?
Must she no more such succous pasture find,
Gone deaf and blind?
Her tree of life drooped from the root:
She said not one word in her heart's sore ache;
But peering thro' the dimness, naught discerning,
Trudged home, her pitcher dripping all the way;
So crept to bed, and lay
Silent till Lizzie slept;
Then sat up in a passionate yearning,
And gnashed her teeth for baulked desire,
and wept
As if her heart would break.

Day after day, night after night,
Laura kept watch in vain
In sullen silence of exceeding pain.
She never caught again the goblin cry:
"Come buy, come buy";
She never spied the goblin men
Hawking their fruits along the glen:
But when the noon waxed bright
Her hair grew thin and grey;
She dwindled, as the fair full moon doth turn
To swift decay and burn
Her fire away.

One day remembering her kernel-stone
She set it by a wall that faced the south;
Dewed it with tears, hoped for a root.
Watched for a waxing shoot,
But there came none;
It never saw the sun,
It never felt the trickling moisture run:
While with sunk eyes and faded mouth
She dreamed of melons, as a traveller sees
False waves in desert drouth
With shade of leaf-crowned trees,
And burns the thirstier in the sandful breeze.

She no more swept the house,
Tended the fowls or cows,
Fetched honey, kneaded cakes of wheat,
Brought water from the brook;
But sat down listless in the chimney-nook
And would not eat.

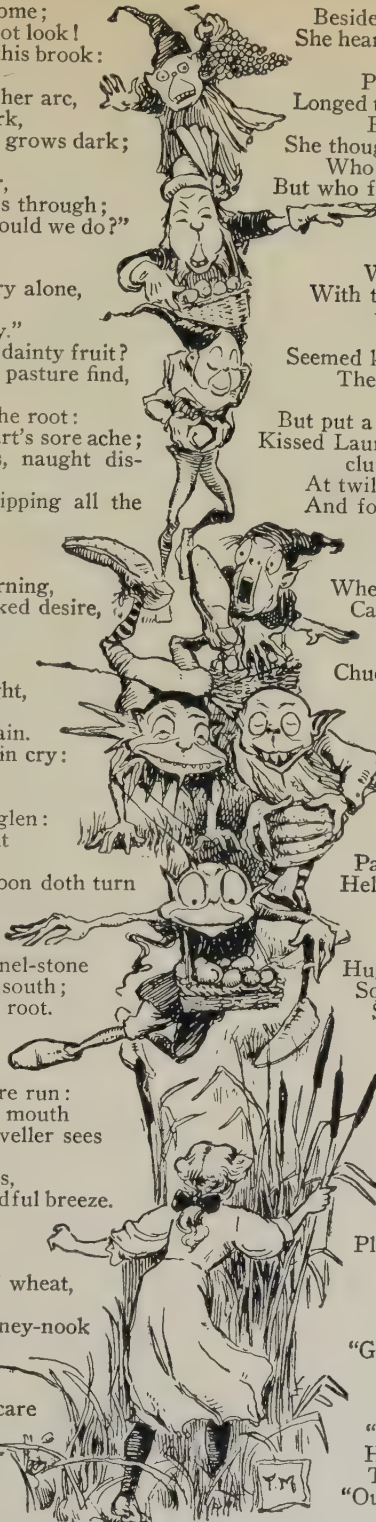
Tender Lizzie could not bear
To watch her sister's cankerous care
Yet not to share.
She night and morning
Caught the goblin's cry:
"Come buy our orchard fruits,
Come buy, come buy":

Beside the brook, along the glen,
She heard the tramp of goblin men,
The voice and stir
Poor Laura could not hear;
Longed to buy fruit to comfort her,
But feared to pay too dear.
She thought of Jeanie in her grave,
Who should have been a bride;
But who for joy brides hope to have
Fell sick and died
In her gay prime,
In earliest winter time,
With the first glazing rime,
With the first snow-fall of crisp
winter time.
Till Laura dwindling
Seemed knocking at Death's door:
Then Lizzie weighed no more
Better and worse;
But put a silver penny in her purse,
Kissed Laura, crossed the heath with
clumps of furze
At twilight, halted by the brook:
And for the first time in her life
Began to listen and look.

Laughed every goblin
When they spied her peeping:
Came towards her hobbling,
Flying, running, leaping,
Puffing and blowing,
Chuckling, clapping, crowing,
Clucking and gobbling,
Mopping and mowing,
Full of airs and graces,
Pulling wry faces,
Demure grimaces,
Cat-like and rat-like,
Ratel- and wombat-like,
Snail-paced in a hurry,
Parrot-voiced and whistler,
Helter skelter, hurry skurry,
Chattering like magpies,
Fluttering like pigeons,
Gliding like fishes—
Hugged her and kissed her;
Squeezed and caressed her.
Stretched up their dishes,
Panniers, and plates;
"Look at our apples
Russet and dun,
Bob at our cherries,
Bite at our peaches,
Citrons and dates,
Grapes for the asking,
Pears red with basking
Out in the sun,
Plums on their twigs;
Pluck them and suck them,
Pomegranates, figs."

"Good folk," said Lizzie,
Mindful of Jeanie;
"Give me much and many."

Held out her apron,
Tossed them her penny.
"Nay, take a seat with us,
Honour and eat with us,"
They answered grinning:
"Our feast is but beginning,
Night yet is early,



Warm and dew-pearly,
Wakeful and starry,
Such fruits as these
No man can carry;
Half their bloom would fly,
Half their dew would dry,
Half their flavour would pass by,
Sit down and feast with us,
Be welcome guest with us,
Cheer you and rest with us."

"Thank you," said Lizzie: "But one
waits
At home alone for me.
So without further parleying,
If you will not sell me any
Of your fruits though much and many,
Give me back my silver penny
I tossed you for a fee."
They began to scratch their pates,
No longer wagging, purring,
But visibly demurring,
Grunting and snarling.
One called her proud,
Cross-grained, uncivil;
Their tones waxed loud,
Their looks were evil.
Lashing their tails
They trod and hustled her,
Elbowed and jostled her,
Clawed with their nails,
Barking, mewing, hissing, mocking,
Tore her gown and soiled her stocking,
Twisted her hair out by the roots,
Stamped upon her tender feet,
Held her hands and squeezed their fruits
Against her mouth to make her eat.

White and golden Lizzie stood,
Like a lily in a flood—
Like a rock of blue-veined stone
Lashed by tides obstreperously,
Like a beacon left alone
In a hoary roaring sea,
Sending up a golden fire,
Like a fruit-crowned orange-tree
White with blossoms honey-sweet
Sore beset by wasp and bee,
Like a royal virgin town
Topped with gilded dome and spire,
Close beleaguered by a fleet
Mad to tug her standard down.

One may lead a horse to water,
Twenty cannot make him drink.
Though the goblins cuffed and caught her
Coaxed and fought her,
Bullied and besought her,
Scratched her, pinched her black as ink,
Kicked and knocked her,
Mauled and mocked her,
Lizzie uttered not a word;
Would not open lip from lip
Lest they should cram a mouthful in;
But laughed in heart to feel the drip
Of juice that syruiped all her face,
And lodged in dimples of her chin,
And streaked her neck, which quaked like
curd.

At last the evil people,
Worn out by her resistance,
Flung back her penny, kicked their fruit
Along whichever road they took,

Not leaving root or stone or shoot.
Some writhed into the ground,
Some dived into the brook
With ring and ripple,
Some scudded on the gale without a sound,
Some vanished in the distance.

In a smart, ache, tingle,
Lizzie went her way;
Knew not was it night or day;
Sprang up the bank, tore thro' the furze,
Threaded copse and dingle,
And heard her penny jingle
Bouncing in her purse—
Its bounce was music to her ear.
She ran and ran
As if she feared some goblin man
Dogged her with gibe or curse
Or something worse.
But not one goblin skurried after,
Nor was she pricked by fear;
The kind heart made her windy-paced
That urged her home quite out of breath
with haste

And inward laughter.

She cried, "Laura," up the garden,
"Did you miss me?
Come and kiss me.

Never mind my bruises,
Hug me, kiss me, suck my juices
Squeezed from goblin fruits for you,
Goblin pulp and goblin dew.
Eat me, drink me, love me;
Laura, make much of me;
For your sake I have braved the glen
And had to do with goblin merchant men."

Laura started from her chair,
Flung her arms up in the air,
Clutched her hair.

"Lizzie, Lizzie, have you tasted
For my sake the fruit forbidden?
Must your light like mine be hidden,
Your young life like mine be wasted,

Undone in mine undoing,
And ruined in my ruin,
Thirsty, cankered, goblin-ridden?"

She clung about her sister,
Kissed and kissed and kissed her:
Tears once again

Refreshed her shrunken eyes,
Dropping like rain

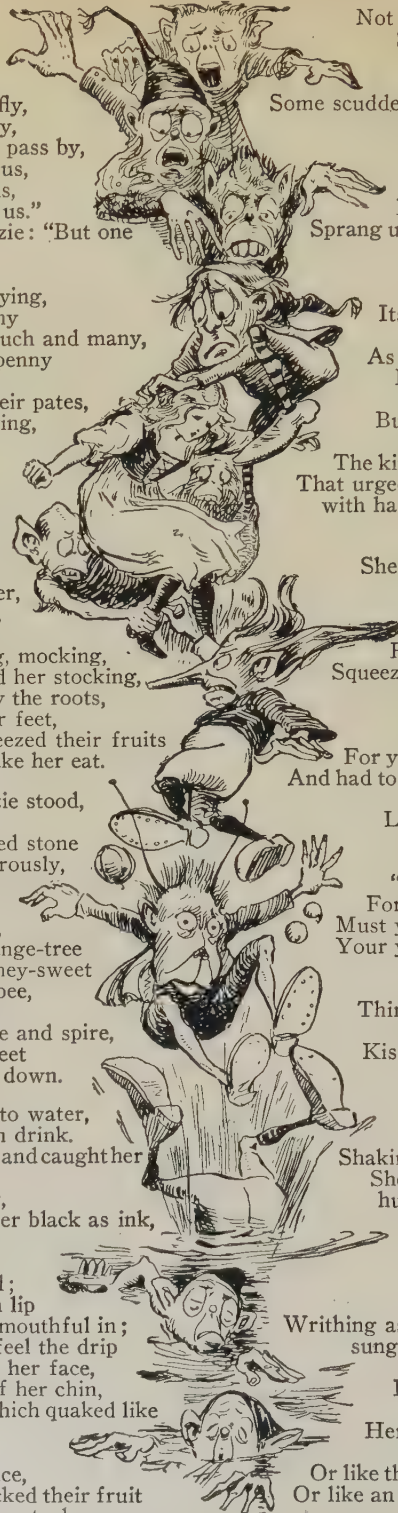
After long sultry drouth;
Shaking with anguish, fear, and pain,
She kissed and kissed her with a
hungry mouth.

Her lips began to scorch,
That juice was wormwood
to her tongue,

She loathed the feast:
Writhing as one possessed she leaped and
sung,

Rent all her robe, and wrung
Her hands in lamentable haste,
And beat her breast.

Her locks streamed like the torch
Borne by a racer at full speed,
Or like the mane of horses in their flight
Or like an eagle when she stems the light
Straight toward the sun,



Or like a caged thing freed,
Or like a flying flag when armies run,
Swift fire spread through her veins,
 knocked at her heart,
Met the fire smouldering there
And overbore its lesser flame;
She gorged on bitterness without a name:
Ah! fool, to choose such part
Of soul-consuming care!
Sense failed in the mortal strife;
Like the watch-tower of a town
Which an earthquake shatters down,
Like a lightning-stricken mast,
Like a wind-uprooted tree
Spun about,
Like a foam-topped waterspout
Cast down headlong in the sea,
She fell at last;
Pleasure past and anguish past,
Is it death or is it life?

Life out of death.
The night long Lizzie watched by her,
Counted her pulse's flagging stir,
Felt for her breath,
Held water to her lips, and cooled her face
With tears and fanning leaves.
But when the first birds chirped about
 their eaves,
And early reapers plodded to the place
Of golden sheaves,
And dew-wet grass
Bowed in the morning winds so brisk to pass,
And new buds with new day
Opened of cup-like lilies on the stream,

Laura awoke as from a dream,
Laughed in the innocent old way,
Hugged Lizzie but not twice or thrice;
Her gleaming locks showed not one
 thread of grey,
Her breath was sweet as May
And light danced in her eyes.

Days, weeks, months, years
Afterwards, when both were wives
 With children of their own;
Their mother-hearts beset with fears,
Their lives bound up in tender lives;
Laura would call the little ones
And tell them of her early prime,
Those pleasant days long gone
 Of not-returning time,
Would talk about the haunted glen,
The wicked, quaint fruit-merchant men,
Their fruits like honey to the throat
 But poison in the blood
(Men sell not such in any town);
Would tell them how her sister stood
In deadly peril to do her good,
 And win the fiery antidote:
Then joining hands to little hands
Would bid them cling together,
"For there is no friend like a
 sister
In calm or stormy weather;
To cheer one on the tedious
 way,
To fetch one if one goes astray,
To lift one if one totters down,
To strengthen whilst one stands."



THE SONG OF THE BOW

This vigorous song, with the ring of open-air England in it, is given here by the courtesy of its author, Sir Arthur Conan Doyle. It is from his *Songs of Action*, but was first printed in his tale of early English life, *The White Company*, one of the best historical stories. It is supposed to be sung by a bowman at a New Forest meeting.

WHAT of the bow?

The bow was made in England,
Of true wood, of yew wood,
The wood of English bows;
 So men who are free
Love the old yew tree,
And the land where the yew tree grows.

What of the cord?

The cord was made in England:
A rough cord, a tough cord,
A cord that bowmen love;
 And so we will sing
Of the hempen string,
And the land where the cord was wove.

What of the shaft?

The shaft was cut in England:
A long shaft, a strong shaft,
Barbed and trim and true;
 So we'll drink altogether
To the grey goose-feather,
And the land where the grey goose flew.

What of the mark?

Ah! seek it not in England:

A bold mark, our old mark,
Is waiting over-sea.

When the strings harp in chorus,
And the lion flag is o'er us,
It is there that our mark will be.

What of the men?

The men were bred in England:
The bowmen, the yeomen,
The lads of dale and fell.
 Here's to you—and to you!
To the hearts that are true
And the land where the true hearts dwell.

THE RAINBOW

John Keble, the writer of this tiny but beautiful poem, was a celebrated poet and a clergyman. He lived from 1792 till 1866, and was professor of poetry at Oxford University, where Keble College was erected as a memorial to him.

A FRAGMENT of a rainbow bright
Through the moist air I see,
All dark and damp on yonder height,
All bright and clear to me.

An hour ago the storm was here,
The gleam was far behind,
So will our joys and grief appear,
When earth has ceased to blind.

Grief will be joy if on its edge
Fall soft that holiest ray,
Joy will be grief if no faint pledge
Be there of heavenly day.

THE SHUT-EYE TRAIN *

The poetry of Eugene Field is the quaintest and prettiest ever written for the entertainment of children, and The Shut-Eye Train is one of the most charming of them all.

COME, my little one, with me!
There are wondrous sights to see
As the evening shadows fall,
In your pretty cap and gown.
Don't detain
The Shut-Eye train—
"Ting-a-ling!" the bell it goeth,
"Toot-toot!" the whistle bloweth,
And we hear the warning call:
"All aboard for Shut-Eye Town!"

Over hill and over plain
Soon will speed the Shut-Eye train!
Through the blue where bloom the stars,
And the Mother Moon looks down,
We'll away
To land of Fay.
Oh, the sights that we shall see there!
Come, my little one, with me there—
'Tis a goodly train of cars—
All aboard for Shut-Eye Town!

Swifter than the wild bird's flight,
Through the realms of fleecy night
We shall speed and speed away!
Let the Night with envy frown—
What care we
How wroth she be!
To the Balow-land above us,
To the Balow-folk who love us,
Let us hasten while we may—
All aboard for Shut-Eye Town!

Shut-Eye Town is passing fair,
Golden dreams await us there;
We shall dream those dreams, my dear,
Till the Mother Moon goes down—
See unfold
Delights untold!
And in those mysterious places
We shall see beloved faces,
And beloved voices hear
In the grace of Shut-Eye Town.

Heavy are our eyes, my sweet,
Weary are our little feet—
Nestle closer up to me
In your pretty cap and gown;
Don't detain
The Shut-Eye train!
"Ting-a-ling!" the bell it goeth,
"Toot-toot!" the whistle bloweth,
Oh, the sights that we shall see!
All aboard for Shut-Eye Town!

LONG AGO *

Eugene Field never touches a subject without infusing into it, as he does here, a charm and a freshness all his own.

ONCE knew all the birds that came
And nested in our orchard trees;
For every flower I had a name;
My friends were woodchucks, toads and
bees.

* From Poems of Eugene Field, copyright, 1910, by Julia S. Field; published by Charles Scribner's Sons. By permission of the publishers.

I knew where thrived in yonder glen
What plants would soothe a stone-bruised
toe—
Oh, I was very learned then—
But that was very long ago.

I knew a spot upon the hill
Where checker-berries could be found;
I knew the rushes near the mill
Where pickerel lay that weighed a pound!
I knew the wood—the very tree—
Where lived the poaching, saucy crow,
And all the woods and crows knew me—
But that was very long ago.

And pining for the joys of youth,
I tread the old familiar spot,
Only to learn this solemn truth:
I have forgotten, am forgot.
Yet here's this youngster at my knee
Knows all the things I used to know;
To think I once was wise as he—
But that was very long ago.

I know it's folly to complain
Of whatsoever the fates decree;
Yet, were not wishes all in vain,
I tell you what my wish should be:
I'd wish to be a boy again,
Back with the friends I used to know.
For I was, oh, so happy then—
But that was very long ago!

THE EARTHLY PARADISE †

This poem is the introduction to The Earthly Paradise, by William Morris, a poetical recital in English of classical stories. The poet disclaims the power of changing the world; he would rather try to lull it to rest. None the less, in his later poems, William Morris tried earnestly to slay what he regarded as social monsters.

OF Heaven or Hell I have no power to sing,
I cannot ease the burden of your fears,
Or make quick-coming death a little thing,
Or bring again the pleasure of past years,
Nor for my words shall ye forget your tears,
Or hope again for aught that I can say,
The idle singer of an empty day.

But rather, when a-weary of your mirth,
From full hearts still unsatisfied ye sigh,
And, feeling kindly unto all the earth,
Grudge every minute as it passes by,
Made the more mindful that the sweet days
die,—
Remember me a little then, I pray,
The idle singer of an empty day.

The heavy trouble, the bewildering care
That weighs us down who live and earn
our bread,
These idle verses have no power to bear;
So let me sing of names remembered,
Because they, living not, can ne'er be dead,
Or long time take their memory quite away
From us poor singers of an empty day.

Dreamer of dreams, born out of my due time,
Why should I strive to set the crooked
straight?
Let it suffice me that my murmuring rhyme

† Published by Longmans Green & Co.

Beats with light wing against the ivory gate,
Telling a tale not too importunate
To those who in the sleepy region stay,
Lulled by the singer of an empty day.

Folk say, a wizard to a northern king
At Christmas-tide such wondrous things did
show,
That through one window men beheld the
spring,
And through another saw the summer glow,
And through a third the fruited vines a-row,
While still, unheard, but in its wonted way,
Piped the drear wind of that December day.

So with this Earthly Paradise it is,
If ye will read aright, and pardon me,
Who strive to build a shadowy isle of bliss
Midmost the beating of the steely sea,
Where tossed about all hearts of men must
be;
Whose ravening monsters mighty men shall
slay,
Not the poor singer of an empty day.

THE LAST RIDE TOGETHER

Selected from *The Last Ride Together* by Robert Browning.
In this delightful love poem, Browning develops the
philosophy of "whatever is, is best." The idea that ful-
fillment of one's desire or ambition may not bring as great
joy as can be found in the quest. We are reminded of
Lessing's similar idea that in the pursuit of knowledge
there is more interest than in the possession of it.

I SAID—Then, dearest, since 'tis so,
Since now at length my fate I know,
Since nothing all my love avails,
Since all my life seemed meant for, fails,
Since this was written and needs must be—
My whole heart rises up to bless
Your name in pride and thankfulness!
Take back the hope you gave,—I claim
Only a memory of the same,
—And this beside, if you will not blame,
Your leave for one more last ride with me.

My mistress bent that brow of hers;
Those deep dark eyes where pride demurs
When pity would be softening through,
Fixed me a breathing-while or two
With life or death in the balance: right!
The blood replenished me again;
My last thought was at least not vain:
I and my mistress, side by side
Shall be together, breathe and ride,
So, one day more am I deified.
Who knows but the world may end to-night?

Hush! if you saw some western cloud
All billowy-bosomed, over-bowed
By many benedictions—sun's
And moon's and evening star's at once—
And so, you, looking and loving best,
Conscious grew, your passion drew
Cloud, sunset, moonrise, star-shine too,
Down on you, near and yet more near,
Till flesh must fade for heaven was here!—
Thus leant she and lingered—joy and fear!
Thus lay she a moment on my breast.

Who knows what's fit for us? Had fate
Proposed bliss here should sublimiate
My being—had I signed the bond—
Still one must lead some life beyond,
Have a bliss to die with, dim descried.
This foot once planted on the goal,
This glory-garland round my soul,
Could I descry such? Try and test!
I sink back shuddering from the quest.
Earth being so good, would heaven seem best?
Now, heaven and she are beyond this ride.

And yet—she has not spoke so long!
What if heaven be that, fair and strong
As life's best, with our eyes upturned,
Whither life's flower is first discerned,
We, fixed so, ever should so abide?
What if we still ride on, we two,
With life for ever old yet new,
Changed not in kind but in degree,
The instant made eternity,—
And heaven just prove that I and she
Ride, ride together, forever ride?

CANADA

To right-thinking men their own land is always dear.
The sentiment is as instinctive as family love. Canada is
the inspiration of this poem by John F. McDonnell.
Poets of every country and in every age have tuned their
lays to this keynote—that the homeland possesses a charm
that other countries lack. Whenever a patriot wanders,
this charm is an invisible bond which ties his heart to the
land of his birth and calls from him the deepest feelings
of unselfish love.

I'VE wandered in the sunny South,
Beneath its purple skies;
And roamed through many a far-off land
Where cloudless beauty lies;
I've breathed the balm of tropic eves
Upon the Southern sea,
And watched the glorious sunset form
Its radiance far and free.

But give me still my Northern home,
Her islands and her lakes;
And her forests old, where not a sound
The tomb-like silence breaks.
More lovely in her snowy dress,
Or in her vesture green,
Than all the pride of Europe's lands,
Or Asia's glittering sheen.

I've basked beneath Italian suns
When flowers were in their bloom;
And I've wandered o'er the hills of Greece,
By ruined shrine and tomb;
Oh, sweet it was to gaze upon
The Arno's silver tide,
And dearer still the ruins grey
Of Athens' fallen pride.

But dearer unto me that land
Which the mighty waters lave,
Where the spreading maple's glorious hues
Are mirrored in the wave;
Where music from the dark old woods
Ascends to heaven's dome,
Like angel hymns of peace and love,
Around my Northern home.

DISDAIN RETURNED

Thomas Carew was the earliest of the Cavalier poets, who turned the idle incidents of court life into poems often rare and pure in melody. His best poem is called *A Rapture*.

HE that loves a rosy cheek,
Or a coral lip admires,
Or from star-like eyes doth seek
Fuel to maintain his fires:
As old Time makes these decay,
So his flames must waste away.

But a smooth and steadfast mind,
Gentle thoughts, and calm desires,
Hearts with equal love combined,
Kindle never-dying fires:—
Where these are not, I despise
Lovely cheeks, or lips, or eyes.

No tears, Celia, now shall win
My resolved heart to return;
I have searched thy soul within,
And find naught but pride and scorn;
I have learned thy arts, and now
Can disdain as much as thou.

Some power, in my revenge, convey
That love to her I cast away.

HOME NO MORE HOME TO ME *

When Robert Louis Stevenson left his homeland, in 1887, to nourish his failing strength in high, dry parts of America and farther afield, he seemed to have a feeling that he would not return. Not long before his death in the Samoan Islands he sent home *Songs of Travel*, written during the seven years of his wanderings, and into them came farewell strains which afterward seemed prophetic. This poem, written after the break-up of the Scottish family household, shows how pathetic memories haunted his exile.

HOME no more home to me, whither must
I wander?

Hunger my driver, I go where I must.
Cold blows the winter wind over hill and heather;
Thick drives the rain, and my roof is in the dust.

Loved of wise men was the shade of my roof-tree.

The true word of welcome was spoken in the door:

Dear days of old, with the faces in the fire-light,

Kind folks of old, you come again no more.

Home was home then, my dear, full of kindly faces;

Home was home then, my dear, happy for the child.

Fire and the windows bright glittered on the moorland;

Song, tuneful song, built a palace in the wild.

Now, when day dawns on the brow of the moorland,

Lone stands the house, and the chimney-stone is cold.

* From *The Complete Poems of Robert Louis Stevenson*, copyright, 1905, 1923, by Charles Scribner's Sons. By permission of the publishers.

Lone let it stand now the friends are all departed,
The kind hearts, the true hearts, that loved the place of old.

Spring shall come, come again, calling up the moor-fowl;

Spring shall bring the sun and rain, bring the bees and flowers;

Red shall the heather bloom over hill and valley,

Soft flow the stream through the even-flowing hours;

Fair the day shine as it shone on my childhood,

Fair the day shine on the house with open door;

Birds come and cry there and twitter in the chimney,

But I go for ever and come again no more.

WHY I ABANDONED YOU

This remarkable sonnet was written at the front in the World War by Tom Kettle, a brilliant Irish Nationalist Member of Parliament, and sent home to his little daughter—a baby. The writer was killed shortly afterward. It will be seen that he expects to die. So it is a voice from the grave, affirming the purity of motive which took a brave man to the war.

IN wiser days, my darling rosebud, blown
To beauty proud as was your mother's prime,

In that desired, delayed, incredible time,
You'll ask why I abandoned you, my own,
And the dear heart that was your baby throne,

To dice with death! And, oh, they'll give you rhyme

And reason; some will call the thing sublime,
And some decry it in a knowing tone.

So here, while the mad guns curse overhead,
And tired men sigh, with mud for couch and floor,

Know that we fools, now with the foolish dead,

Died not for flag, nor king, nor emperor,
But for a dream born in a herdsman's shed,

And for the secret Scripture of the poor.

A PIPER

The naturalness of joy is one of the big things we are likely to forget, but poets are licensed to believe that a merry piper can bring it to life again. The poet who writes these lines is Seumas O'Sullivan, an Irishman, and the Irish are always fluctuating between sadness and mirth.

A PIPER in the streets today

Set up, and tuned, and started to play,

And away, away, away on the tide

Of his music we started; on every side

Doors and windows were opened wide,

And men left down their work and came,

And women with petticoats coloured like flame.

And little bare feet that were blue with cold

Went dancing back to the age of gold,

And all the world went gay, went gay,

For half an hour in the street today.

CORONACH

Coronach is a dirge written for the chief, stricken in the prime of his manhood, when the need for him "was the sorest." *Correi* means crag; *cumber*, trouble; *foray*, raid. One can, in imagination, hear the wild minor key of the pipes accompanying.

HE is gone on the mountain,
He is lost to the forest,
Like a summer-dried fountain,
When our need was the sorest.
The font, reappearing
From the raindrops shall borrow,
But to us comes no cheering,
To Duncan no morrow!

The hand of the reaper
Takes the ears that are hoary,
But the voice of the weeper
Wails manhood in glory.
The autumn winds rushing
Waft the leaves that are serest,
But our flower was in flushing,
When blighting was nearest.

Fleet foot on the correi,
Sage counsel in cumber,
Red hand in the foray,
How sound is thy slumber!
Like the dew on the mountain,
Like the foam on the river,
Like the bubble on the fountain,
Thou art gone, and for ever!

A WALK IN SPRING

In these verses by M. A. Stodart the writer imagines the thoughts that come to a boy or girl when the chill days of winter have said good-bye and the smiling days of spring have come back again.

I'M very glad the spring is come—the sun
shines out so bright,
The little birds upon the trees are singing
for delight,
The young grass looks so fresh and green,
the lambkins sport and play,
And I can skip and run about as merrily as
they.
I like to see the daisy and the buttercups once
more,
The primrose and the cowslip too, and every
pretty flower;
I like to see the butterfly fluttering her
painted wing,
And all things seem, just like myself, so
pleased to see the spring.
The fishes in the little brook are jumping up
on high,
The lark is singing sweetly as she mounts
into the sky;
The rooks are building up their nests upon
the great tall tree,
And everything's as busy and as happy as
can be.
There's not a cloud upon the sky, there's
nothing dark or sad;
I jump, and scarce know what to do, I feel
so very glad.
God must be very good indeed, Who made
each pretty thing:
I'm sure we ought to love Him much for
bringing back the spring.

LEISURE

These lines are perhaps the best example of the natural simple poetry of W. H. Davies, who won attention by his descriptions of his travel experiences as a tramp. That he sees the worlds of outdoor life and of human character with a poet's eye and has a rare intuition for romance is universally felt. He has, too, a fine gift of selective criticism.

WHAT is this life if, full of care,
We have no time to stand and stare?

No time to stand beneath the boughs
And stare as long as sheep or cows.

No time to see, when woods we pass,
Where squirrels hide their nuts in grass.

No time to see, in broad daylight,
Streams full of stars, like skies at night.

No time to turn at Beauty's glance,
And watch her feet, how they can dance.

No time to wait till her mouth can
Enrich that smile her eyes began.

A poor life this if, full of care,
We have no time to stand and stare.

TALKING IN THEIR SLEEP *

Is this not a pretty poem? So simple and true! The hiding of life and its resurrection is one of the world's increasing wonders. The sympathy between outdoor things—trees, grass and flowers—a sympathy limited and imperfect, is here daintily expressed by Edith M. Thomas.

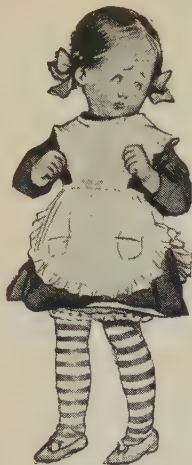
YOU think I am dead,
The apple tree said,
Because I have never a leaf to show—
Because I stoop,
And my branches droop,
And the dull grey mosses over me grow!
But I'm all alive in trunk and shoot;
The buds of next May
I fold away—
But I pity the withered grass at my root.

You think I am dead,
The quick grass said,
Because I have started with stem and blade!
But under the ground
I am safe and sound,
With the snow's thick blanket over me laid.
I'm all alive and ready to shoot
Should the spring of the year
Come dancing here—
But I pity the flower without branch or root.

You think I am dead,
A soft voice said,
Because not a branch or root I own!
I never have died,
But close I hide
In a plummy seed that the wind has sown.
Patient I wait through the long winter hours;
You will see me again—
I shall laugh at you then,
Out of the eyes of a hundred flowers.

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LITTLE VERSES FOR VERY LITTLE PEOPLE



PEMMY was a pretty girl,
But Fanny was a better;
Pemmy looked like any churl,
When little Fanny let her.

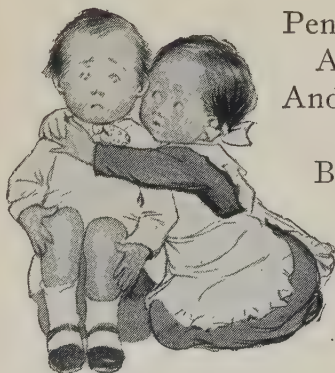


Pemmy had a pretty nose,
But Fanny had a better;
Pemmy oft would come to blows,
But Fanny would not let her.

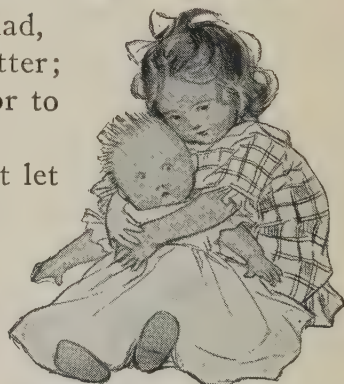
Pemmy had a pretty doll,
But Fanny had a better;
Pemmy chattered like a poll,
When little Fanny let her.



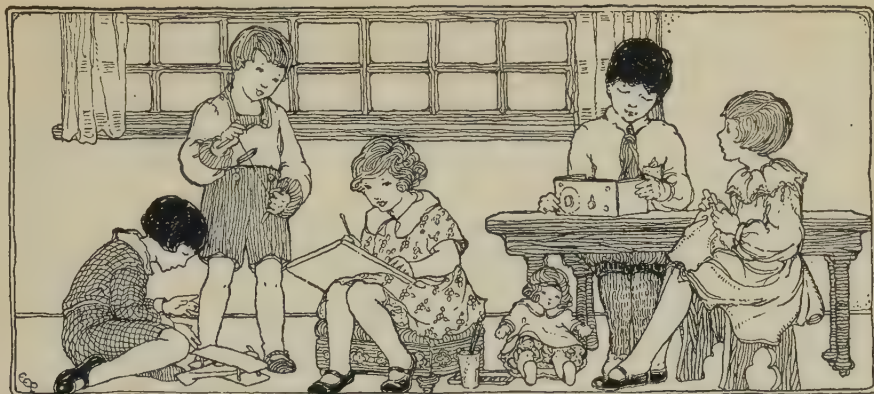
Pemmy had a pretty song,
But Fanny had a better;
Pemmy would sing all day long,
But Fanny would not let her.



Pemmy loved a pretty lad,
And Fanny loved a better;
And Pemmy wanted for to wed,
But Fanny would not let her.



S.B.P.



A VIOLIN FROM A CIGAR BOX

THE easiest musical instrument to play is the one-stringed violin. If we have what is called "a good ear" for music; if, in fact, we can hum, sing or whistle an air correctly after having heard it once or twice, we shall soon be able to play a one-stringed violin. We need not study music. We need not even be able to read the notes. We shall simply learn by experience where to put our fingers on the string of the violin to get any note we require, and in a very short time, perhaps in a day or two, we shall be able to play simple tunes.

Occasionally these instruments are to be seen in music shops, but it is so easy to make one that it is really hardly worth while to spend money. We shall make our violin out of a cigar box. The right size is a box made to hold fifty cigars.

First, we must take off all the paper that is stuck round the edges of the box. The easiest way to do this is to scrub it off with a hard nail-brush that has been dipped into boiling water. We must not make the wood wetter than we can help or it will warp. The lid will now come right off, because it was only the paper that formed the hinge. On this lid we must draw with a pencil the two little figures, something like an S in shape, that are shown in the illustration. We can cut these shapes out with a fret-saw in a few minutes. Let us do it as neatly as we can, for the appearance of our violin depends upon

CONTINUED FROM 3024



The bridge.



The stop.



The peg.



The picture on the left shows the violin without box-lid and that on the right the complete violin. A, Cigar box; B, bridge; C, peg; D, stop.

this part being done well.

Now we must get a piece of hard wood about 30 inches long. Walnut or mahogany will do. It should be about $\frac{3}{4}$ inch wide and $\frac{1}{2}$ inch thick. A carpenter will cut a piece to these measurements for a quarter. We should ask him to plane away the sharp edges on one side and leave the others square. Then, when we look at the end of the wood, we shall see that it is shaped like a D—round on one side and flat on the other. Now, with a sharp penknife we must cut two notches in the ends of the cigar box for this piece of wood to fit into. When we have made the notches almost big enough with the knife, we should wrap a piece of sand-paper round the wood that is to fit into them and rub it steadily backward and forward in the notches until they are quite smooth. In this way we can fit the wood into them very neatly.

Now we glue the wood into the notches, leaving about 1 inch projecting at one end. Then we put a little glue all round the edges of the box and on the wood between the two sides, and fix the lid into its place again. A few tiny brass screws put in carefully round the edge of the lid will make it all quite firm.

Now, about 1 inch from the end of the long piece of wood, we make a hole about $\frac{1}{8}$ inch in diameter, and fit into it a small wooden peg shaped like the one shown in the picture.

Our violin is now practically complete. We need only two

tiny pieces of some hard wood. One will form what is called the bridge, and the other will be merely a thin strip which is glued close to the peg and is called the "stop." We can cut them out of a boxwood ruler that costs a nickel. The picture shows how they are to be fixed.

Now we must go to a music store and ask for one "A" string for a violin, at a cost of 20 cents. "A" strings are generally made double the length required for ordinary violins, so they will be just right for ours. We had better tell the shop people that we want a double-length one, uncut, and they will understand. At the same time we can buy a violin bow. New ones can be bought for a dollar, but often music stores have second-hand ones that will be sold for much less, and these are sometimes better than those that have never been used before.

Before we attempt to fix the string we must cut the little piece of wood that projects from the bottom of the violin to a point. Then we must make the box quite smooth with sand-paper and give it a coat of varnish.

When the varnish is quite hard, we take the string and make a loop at one end large enough to slip over the projecting point. Then we stretch the string to the other end, make a small hole through the peg, and thread the string through it. Now we put the "bridge" into its proper place, as shown in the drawing, and make the string tight by turning the peg. When it is tight, we draw the bow across it

gently, and if it gives out a clear note, our violin is a success.

Now we shall find that it is possible to amuse ourselves for hours trying to play on it, and we shall be surprised to find how quickly we shall learn to slide our finger up and down the string so as to get the notes we want.

In a very few hours we shall have learned to play something, and then we shall improve every day. Probably we should never learn to play an ordinary violin by ourselves; that is why people say it is such a "difficult" instrument. But this kind which has only one string is the easiest instrument to play that has ever been invented.

But although it is easy to learn, we must not think that it does not sound well. When we have practiced for some time we shall be delighted with it. Then we can get somebody to accompany us on the piano, and we shall improve rapidly till we have become quite good violinists.

These one-stringed instruments are often played at public concerts, and some performers become well known for the effects they can produce. Most of them play on cigar-box violins that they have made themselves in the manner here described. It must be explained that this instrument is not held like an ordinary violin. The box part is placed between the knees, the string is fingered with the left hand, and the bow is held in the right hand.

A BEAD BELT FOR AN INDIAN COSTUME

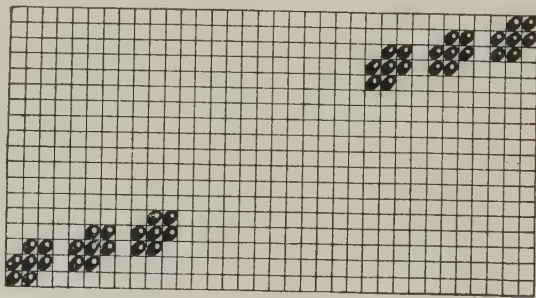
THERE are three ways of making a bead belt. We can string the beads together somewhat after the method shown on page 1399, without attaching them to any material. We can make the belt on a loom, which sounds very difficult, but is really a good way and very interesting to do. A third way is to sew the beads on to canvas. As the last of these three is quite easy, we are going to follow that way first, and later on find out not only how to use the bead loom, but how to make one for ourselves.

Now for the materials. We shall need a strip of fine canvas which may be cut from $1\frac{1}{2}$ inches to 2 inches wide, according to the width of belt desired. The length of the strip must, of course, depend on the measurement of the waist.

But as we are going to make a particular belt, we decide that it shall measure 21 inches in length and $1\frac{1}{2}$ inches in width. As to the material, Penelope canvas, No. 50, 27 inches wide, is suitable, and $\frac{1}{4}$ yard would make several belts. A fine cream-colored French canvas is also used for beadwork. We shall need a spool of white linen thread, or, better still, some white dental floss. The floss looks

better and wears well, provided the beads are good ones and do not cut it. Waxing the thread or floss a little prevents injury. It would never do to have the thread break and the beads drop off the belt. The choice of beads depends much on the pattern to be worked. The opaque Tosca beads would suit our design. They must be evenly formed and of a size to fit the hole or mesh in the canvas. The price is only a few cents a package, and we shall need about 6 packages of pale blue, 1 of white, and a few amber crystal beads.

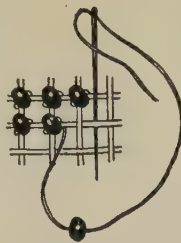
We can buy bead needles by the paper, and we had better try one through the canvas and a bead to see that it is the right size. No. 12 will probably fit. The pretty design which we have chosen for our belt has three white daisies in a row, at intervals of 1 inch between the rows, placed along the edges of the belt, as shown in picture 1. The daisies will go with any shade; therefore the color of the background can match that of the dress with which the belt is to be worn. We will make it pale blue. It is well to cut the canvas about 24 meshes wide, so that 3 meshes are left for turnings at each edge, and the 18



1. The pattern.

meshes between filled with beads. The ends of the canvas must also be cut to allow for turnings, so we make the strip a little longer than 21 inches.

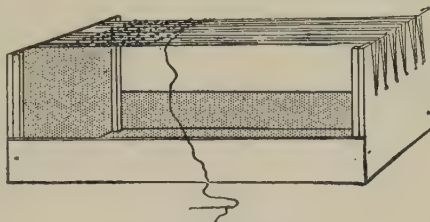
The beads are sewn on to the canvas where the bars cross, and they always lie crosswise on the canvas, or diagonally. We secure the knotted end of the thread or floss on the wrong side of the canvas, beginning at the lower left-hand corner of one end. To sew on a bead we thread one, pass the needle down into a mesh, pass it behind and under the cross-bar below and bring it through the mesh, as shown in picture 2. Beads are thus sewn on till the end of the row is reached.



2. Sewing on the beads.

As all the beads must slant in the same direction, when we reach the opposite end of the belt we can either turn the canvas upside down and proceed with the next row of beads, which is the simpler way, or we can run the needle along the back of the canvas, and sew the next row of beads under the last one.

We must look carefully at the pattern to find out where to sew the six white beads for the daisy petals and the amber ones for the centres. To avoid possibility of error, it is well to mark with a pencil the position of the daisies on the canvas, so that we shall know where to replace the blue beads with the white and amber ones for the centres.



3. The bead loom.

When the beads cover the canvas, we stitch down the turnings and line the belt with sateen to match the blue groundwork beads. Then clasps can be sewn on to the ends. Pretty ones may be had for a very trifling sum.

Small beadwork articles can be made by threading the beads together like a network without using any material for a support, and keeping two needles and threads in use while threading them. The work is then backed to give it a support.

This method is not advisable where a large surface is to be covered. It is somewhat like that of the loom-work now to be described.

A bead loom is not a large machine, but a small and most useful contrivance for making many bead articles. It has long been a popular contrivance, and is getting very well known. We can buy one at a fancy-needlework store in almost all our cities—or we can make one for ourselves out of an oblong wooden cigar box in the way shown in picture 3. First we take off the lid. Then we cut down the two sides by ruling a line along them 1 inch from the bottom. After passing a sharp knife several times along the line,

the wood will snap off, and the rough edges can be smoothed with sandpaper.

The small strips of wood half an inch square seen from the ends, to match the height of the box, are nailed inside the corners to strengthen the ends. Along the tops of the end pieces we cut little notches $\frac{1}{16}$ inch apart. These are to hold the warp threads, which are stretched across the open box and fastened round six little screw-eyes below in the end pieces of the box.

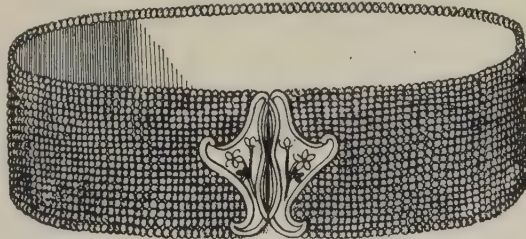
This home-made bead loom will be found useful for all kinds of purposes. A simpler one still can be made by nailing two upright pieces of wood on to a bar, or even by nailing two pieces of perforated cardboard to the wooden frame of a child's slate.

The woof threads should be just two-thirds as coarse as the warp ones. For instance, a warp thread No. 60 would have a woof thread No. 90. A bead needle size No. 11 and loom beads about No. 4-0 will be needed.

To make our belt, which, it will be remembered, is 18 beads wide, we fasten to the loom 20 warp threads about 26 inches long. The two outer ones are to form the edges of the belt.

First we take a needleful of white linen thread and tie it to the upper left-hand warp thread, and then thread 18 beads on to it, according to the pattern which we have chosen.

Now comes the important thing in bead loom-work. We carry the needle with the string of beads *under* the warp thread, so that when the fingers press the beads upward from underneath, they come up through the spaces between the warp threads. To keep them in place we pass the needle through the beads from right to left *over* the warp threads this time. The row of beads is now secure. We proceed with the other rows, picking up the blue, white or amber beads according to pattern. The woof thread is fastened off by passing it through two or three rows of beads. Having made the belt the desired



4. The bead belt complete.

length, we gather the warp threads into four bundles of five each and tie these up close to the beads. They can be stitched on to a piece of silk or other material, and clasps attached to the two ends of this. The daisies will look best done on beadwork done with the loom, because the beads are placed perpendicularly in threading them, not diagonally, as in canvas-work.

Many of the designs of Indian squaws are both quaint and beautiful.

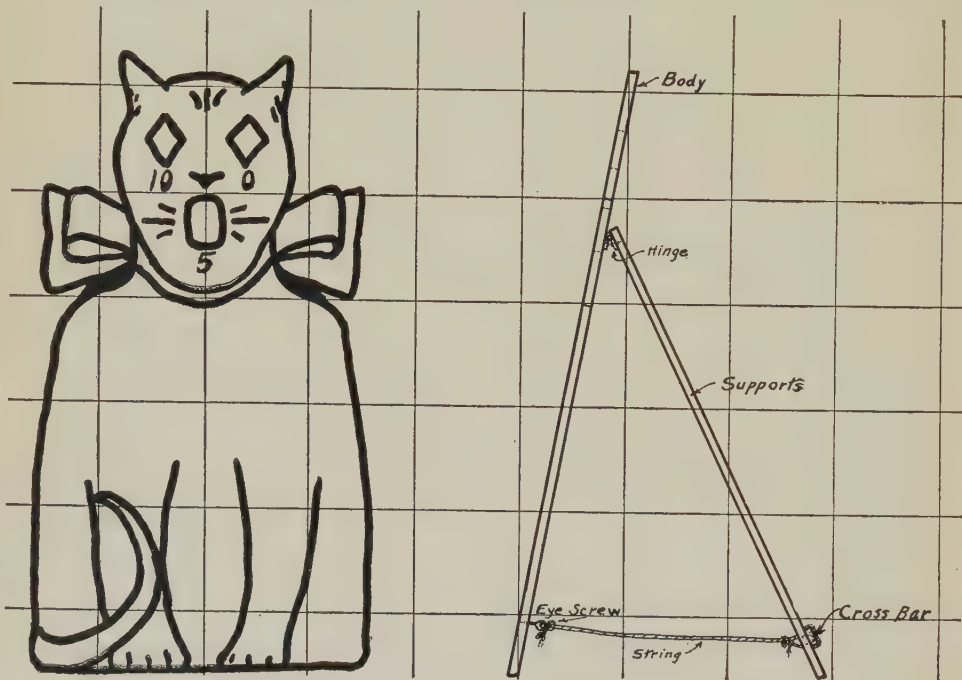
MAKE AND PLAY THROW BEAN-BAG GAME

THIS throw bean-bag game is easily made and will furnish plenty of amusement for both small and large children. The target board is simply constructed from $\frac{3}{8}$ -inch soft wood or any thin composition wood, such as so-called beaver board, while the two bean-bags are made as explained on page 132. Much delight results from playing the game to determine which of two persons can win the higher score by throwing the bean-bags through the holes in the target board.

Although it is somewhat easier to make the target board rectangular in shape, it can be given a more attractive appearance by shaping it to represent the front view of an animal. The

After sawing the body of the target to the desired shape and making the three holes shown, by boring several small holes and chiseling out the remaining wood, this piece is carefully sandpapered and painted in outline form to represent the animal chosen. It is well to designate the number of points which may be earned by throwing the bean-bag into each hole. These are given as "5" for the mouth, "10" for the left eye, and "0" for the right eye.

Now the two supports are made of wood of about the same thickness and should be $2\frac{1}{2}$ inches wide and 14 inches long. These are strengthened with a cross-bar of the same stock which is nailed near the bottom of each support,



Front and side views of a bean-bag board.

familiar house cat, which has been chosen for the accompanying drawing, lends itself especially well to the general dimensions that are found to be most satisfactory for this game board. After you have decided upon the general design of the target which should be approximately 10 inches wide and 18 inches high, fold a piece of wrapping-paper and cut out the exact shape desired. Then copy this pattern on the $\frac{3}{8}$ -inch stock which you have selected. It is important that only thoroughly dry lumber be used for this purpose, as such thin material will otherwise warp. Care should likewise be taken in placing the design on the wood to avoid short-grain as much as possible. The three holes into which the bean-bags may be thrown should be made large enough to accommodate the bean-bags that will be used. As shown in the drawing, these holes may be planned to form the cat's eyes and mouth.

and are held to the back of the body with butt hinges which make the supports easily adjusted. By using a string and a screw-eye as shown in the drawing, it is possible to determine the most suitable angle for the supports and then to hold this by tying the other end of the string about the cross-bar. It will be more satisfactory to varnish the face of the target to protect the painted surface, although this is not necessary.

Two bean-bags are needed to make the game complete. It has been suggested that two of the cat bean-bags described on page 132 might well be made for this target board. However, if another animal form is used for the body of the target, the directions given for this bean-bag may be modified in order that the bags and board may match. If desired, these bean-bags may be made plain. In any case, care should be taken to have these bags planned before the

A PORTABLE STOOL THAT A BOY CAN MAKE

holes are cut in the target board in order that no difficulty may be had in having the bean-bags pass through the holes easily when they should.

Throw Bean-bag is played by having two or more persons stand a reasonable distance from the target board to throw the bean-bags at the holes which permit the players to earn points.

Although the game may be played by having each person throw one bean-bag at each trial, it is usually found more satisfactory to allow one player to throw both bags while the other player returns them. It will be observed that only two of the holes permit one to score, as the other one gives no points. The player who first scores 100 points wins the game.

A PORTABLE STOOL THAT A BOY CAN MAKE

A STRONG and convenient folding camp-stool is quite easily made from poplar or any other close-grained wood which has been cut slightly larger than the following sizes.

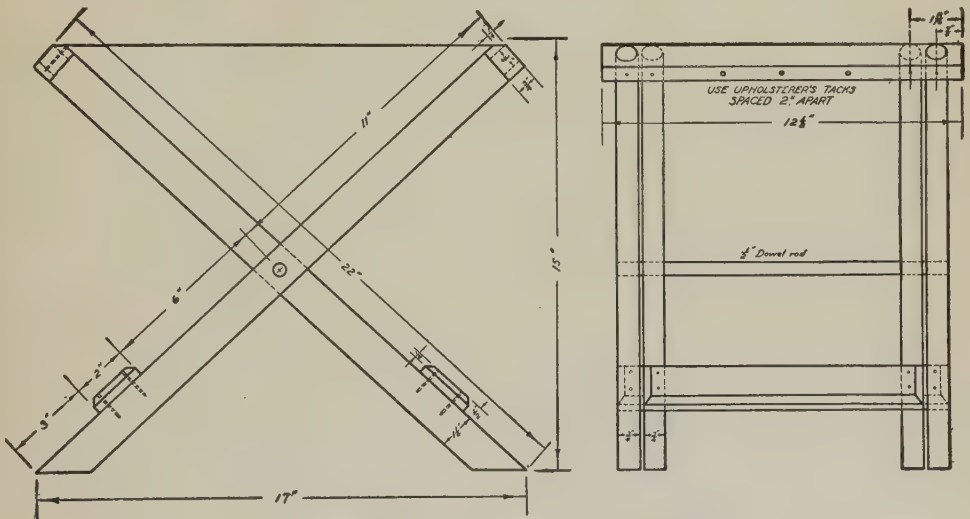
- 4 pieces $\frac{3}{4}$ " x $1\frac{1}{4}$ " x 1' 10" for the legs.
- 2 pieces $\frac{3}{4}$ " x $1\frac{1}{4}$ " x 1' $1\frac{1}{2}$ " for the cross-rails.
- 1 piece $\frac{1}{2}$ " x 2" x $11\frac{1}{2}$ " for a cross-cleat.
- 1 piece $\frac{1}{2}$ " x 2" x $9\frac{7}{8}$ " for a cross-cleat.
- 1 piece $\frac{1}{2}$ " (dia.) dowel rod 11 $\frac{1}{2}$ " long for pivot rod.

In shaping these parts the following directions will assist you.

First, plane four legs to the specified thickness and width, and then saw one end of each

intersection of diagonal lines, and carefully sawing or chiseling to the lines and down $\frac{3}{4}$ inch, which is the length of tenons.

The two cross-rails are next planed to size and $\frac{3}{4}$ -inch holes are bored for the round tenons, as specified in the plan shown on this page. Then the inside edge of each piece is beveled, or chamfered, to remove the sharp edge over which the canvas or carpet is to be placed. This should be made so that it will be level when the stool is open. The two cross-cleats are each chamfered $\frac{1}{4}$ -inch on both ends and the bottom edge, as shown, to eliminate sharp edges upon which the clothing might become caught.



USE CANVAS, CARPET, OR STRONG CLOTH FOR THE SEAT

leg square. Now measure 22 inches from these squared ends and make points. To determine the exact angle to which the other ends are to be cut, cross two legs exactly as shown in the working drawing, and nail them together with a single brad. Next, place a yardstick on the two points marked, and spread the legs until the outside measurement is just 17 inches. Now, mark along the edge of the yardstick to give correct angles for the bottom of legs, remove the nail holding the legs together, and saw on the lines just made. The proper angles for the other two legs may be had by using one of these legs as a pattern. Round tenons are next made on the other ends of the legs by scribing $\frac{3}{4}$ -inch circles from the centre points of the ends, which are found by the

In assembling the parts of the camp-stool, after $\frac{1}{2}$ -inch holes have been bored in the middle of the legs for the dowel rod, brads are found entirely satisfactory for holding the cross-rails, cross-cleats and dowel rod in place. In fastening the dowel rod it must be remembered that this is the pivot rod and therefore should only be nailed to the outside legs. The canvas, carpet or strong cloth chosen for the seat is turned under and held in place with upholsterer's tacks, which are spaced 2 inches apart.

If desired, the wood may be stained and waxed, or varnished, to give it a finished appearance. However, before this is done the folding camp-stool should be carefully sandpapered to remove any sharp edges or rough surfaces.

FRUIT TREES ON THE DINING-TABLE

IT is quite possible for us to have a little orchard of fruit trees actually growing on the dining-table. Then our guests may pick their fruit from the trees as they sit at the table with us. The explanation is, of course, that we grow miniature fruit trees in flower-pots, and place them on the table when dinner is served. They form a very novel and striking table ornament.

The trees grown may be apple, pear, plum, cherry, peach and nectarine. First we choose seedlings or trees that have been grown in the ordinary way, but are quite young. Then, taking one of these young trees, we cut off the tap-root and plant the tree in a pot—a 6- or 7-inch pot is the most suitable size. The pot should be about half filled with sand, and a layer of rich mold should be put on top.

The time to plant these young trees in pots is toward the end of October, and the pot with the seedling should be sunk into the soil, and left until the following spring, when the buds begin to swell. It should then be removed and put in a cool greenhouse, or, if this is not available, in the window of an ordinary dwelling-house.

Water should be given very sparingly, and this should always be rain water, or the little tree will not thrive. It must be pruned severely, and moved into a larger pot only when this becomes absolutely necessary, owing to the withering of the tree. In removing to a larger pot we must always be careful to thin the roots.

While the method that has been described here is the best to produce healthy and fruitful little trees, there is another method that may be followed with success, and that is to pot the trees in the spring just as the buds begin to swell, and then place them at once in the greenhouse or window.

The dwarf tree may be kept in the cold, and pruned until it is wanted to flower, but the blossom can be brought on at almost any time of the year by treating the tree with liquid fertilizer and removing it to a warm room. It is astonishing how quickly the flowering begins. If the tree is pruned so as to grow pyramid shape, it makes a fine ornament for the table, when covered with blossoms. The trees may be from 10 to 40 inches in height.

When the fruit is fairly formed, if we remove the tree from the warm room into the cold again, it will be thrown back, and then, later, we can put it once more into a warm room, when blossom and ripe fruit will be produced on the same tree at the same time. By keeping in a cold room or house, the blossoms and

fruit may be preserved on the tree for several weeks. Of course, only experience will enable us to produce the blossoms and fruit exactly when we want them, but the course described here, if followed out carefully, will result in success.

In these miniature fruit trees for the dining-table the trees are dwarfed, but the leaves and fruit are the same size as on an ordinary full-grown tree in the orchard. Such toy plants are quite different from the Japanese dwarf trees, many of which are grown for a century or two.

The Japanese gardeners can take a small plot of land and with dwarf trees they can get the effect of a wonderful wooded spot of great extent.

In these the whole tree is miniature—branches and leaves—and the plant is like a perfect model of a tree in shape and character. In fact, we might almost think we were looking at a full-grown tree through a diminishing glass, or through an opera-glass or telescope held round the wrong way. It is often stated that there is some great and mysterious secret about the cultivation of these trees which is known only to the Japanese, and that no European can possibly grow a real dwarf tree. But this is by no means the case.

The tree is grown, in the first place, in the usual way, but in a small pot, and the young shoots are pinched back, or nipped off with the finger and thumb, between April and June. This is done to prevent growth. In the summer sufficient water is given to keep the soil moist, but in winter very little water is given, the soil being covered with moss. It is well to have large pebbles or bits of old drain-pipe at the bottom of the pot so that the water will not lodge there and harm the roots with over-moisture. If the roots are always in water a sort of damp rot sets in. In the spring and autumn manure, in the form of powdered oil-cake, is supplied twice a week.

Every third or fourth year the tree is repotted, but it is not placed in a larger pot unless it is absolutely necessary. Sometimes the trees need changing to new pots only after five or six years. When the pots are changed about a third of the old soil is removed, being very carefully worked away from between the roots with a skewer or awl.

Ash and box and lilac are easily grown, but oak is the most difficult of all trees to dwarf. Grass seed may be planted in the soil round the tree, and the grass kept cut short with scissors, so that we can have a tiny tree growing in an equally miniature lawn. The trees should be kept in a sheltered position, but they may be placed in the garden.

ANSWERS TO THE GAME OF "WHAT IS IT?"

THESE are the answers to the History Puzzles that are to be found on page 3023:

1. King John signing Magna Carta.
2. Landing of the Pilgrim Fathers with their wives and children from the Mayflower.
3. Queen Margaret, the wife of Edward IV, and her little son, saved by a robber.

4. Luther nailing his propositions to Wittenberg church door, and burning the pope's bull of excommunication which was sent to him.

5. Sir Francis Drake warned of the approach of the Spanish Armada while at bowls.

6. The Emperor Napoleon imprisoned in the little island of Elba in the Mediterranean.

HOW TO STAIN, POLISH AND LACQUER

WOODWORK is stained to improve its natural color. The difference between stain and paint is that stain sinks into the fibres of the wood and colors or dyes them, but leaves the grain of the wood showing as plainly as before, so that you can still quite easily see what wood it is. Paint forms an opaque coat on the surface which quite conceals the material beneath. Generally stain is used to make a cheap wood look like an expensive one. The colors used are chiefly imitations of walnut, mahogany, rosewood and other woods. These stains are used on lighter-colored common woods, such as common white-wood, pine and deal, and only for good appearance and not to deceive people, for anyone with a little experience can tell what the wood really is.

Sometimes, though not often, colors quite different from that of any wood, such as green, blue or red, are used as stains. Very often fancy woods are darkened and improved in appearance by stains of the same color as themselves.

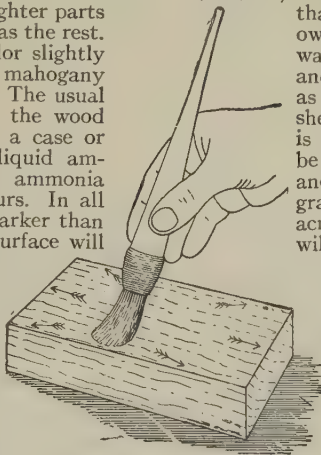
Stain is used also to darken lighter parts of the wood to the same shade as the rest. Wood may be darkened in color slightly by rubbing oil into it. Oak and mahogany can be darkened by ammonia. The usual way to do this is not to wet the wood with it, but to shut it up in a case or small room with saucers of liquid ammonia. The fumes of the ammonia darken the wood in a few hours. In all cases stained wood must be darker than the natural color, for a dark surface will show through a lighter stain.

Stains for wood are sold ready for use in small bottles by all dealers. They may be put on with a brush, or rubbed in with a rag. The neater way is to use a brush. Generally two coats are given. With only one coat it is not easy to keep the same shade of color all over, for any overlap with the brush in applying the first coat shows darker than parts over which the brush has passed only once. In succeeding coats this becomes less and less noticeable, so that the best result can be obtained by using weak stain and applying a number of coats, never putting on the next coat until the previous one has become quite dry. The surface must be smoothed with sandpaper before the first coat and after each coat has thoroughly dried. Otherwise it will feel and look rough, for anything which wets the wood causes its surface to roughen as it dries. Varnish stains are often used instead of simple stain. These are varnish and stain combined, and save the trouble of staining and varnishing separately. If done separately, it is necessary that the wood should be stained before it is varnished.

Varnish. Varnish does not conceal the character of the wood beneath it, for it is almost transparent unless something is added to color it. It simply produces, when dry, a hard, glossy film on the surface, which protects the wood from the effects of dampness and from becoming discolored by dirt.

Quick-drying varnish consists of shellac dissolved in methylated spirit. The spirit evaporates and leaves a thin layer of shellac on the surface of the wood. Shellac varnish is used only for indoor work. In making varnish for work exposed to the weather it is necessary to use linseed oil instead of spirit, and copal, mastic, amber or dammar in place of shellac. Varnish may be used either on the bare wood or on paint.

Varnish is applied with a brush. Two or three coats are put on, each being allowed to dry and then smoothed with fine glasspaper before applying the next. For large surfaces a large brush should be used, so that the varnish can be spread quickly. For small work a small brush is better. The varnish should be put on uniformly, so that some parts shall not be more thickly coated than others. Varnish should not be allowed to run over edges or corners of the article being varnished, and the brush should be used so that it does not leave marks of its own all over the work. The best way is to take one surface at a time and cover it with varnish as quickly as possible—that is, if ordinary shellac varnish, which dries quickly, is being used. The brush should be held as shown in picture 1, and should move in line with the grain of the wood. If it is used across the grain, marks of the brush will show more distinctly. To



1. How to varnish wood.

prevent varnish from getting squeezed out of the brush and running over the edges of the wood, the brush should always move outward to the edges, as indicated by the arrows in picture 1. In approaching the ends of the wood it goes directly to the edges, but in passing along the sides its direction is only very slightly diagonal toward the edges there, so that the movement shall be as nearly as possible in line with the grain. Spirit varnish dries in a few minutes, but to obtain the best results each coat should be allowed several hours to harden before sandpapering it down for the next. After the first coat, old sandpaper which has already been worn smooth by previous use should be employed, and after the final coat the work should not be rubbed down at all. Sandpaper should always be rubbed in line with the grain of the wood. If rubbed across it scratches the surface too much.

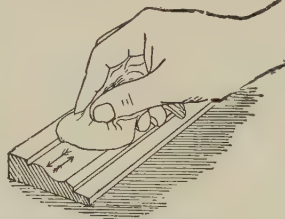
Polish. The difference between polishing and varnishing is chiefly in the method of application, for shellac varnish and polish are practically the same thing.

The distinction between varnishing and polishing is that varnishing is done with a brush and polishing with a rag. Polishing requires more skill and time, but it gives a smoother and glossier surface than varnishing. It is important in polishing that the pores of the wood shall first be thoroughly filled so that the polish cannot sink in and lose its

lustre. A number of applications of polish with long intervals for drying will do this, but it is quicker and cheaper to fill the pores with some other substance before beginning to polish. The filler is generally whiting or plaster of Paris dissolved in water, turpentine or oil, and colored to match the wood. It is rubbed in and allowed to dry, and then the surface is sandpapered smoothly. The wood is now ready to receive the first application of polish.

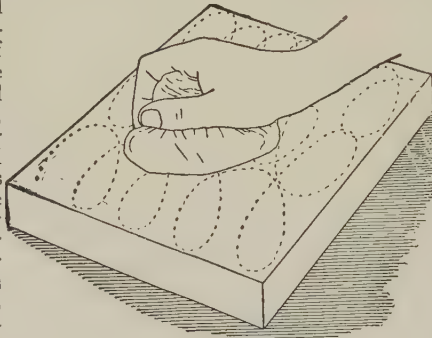
The rag used in polishing is called a "rubber." It should be a piece of soft white linen. This is used as an outer covering to a pad of cotton batting.

The cotton batting is moistened with polish, and the single thickness of rag incloses it and is drawn up like a pudding-cloth at the top and grasped by the hand while it is used. Picture 2 shows a small rubber held in this way by the thumb and fingers only. Picture 3 shows a larger one. The pressure on the rubber should not be heavy, and a few drops of linseed oil are put on the rag to make it move about freely without tendency to stick. The polish is put on the cotton batting

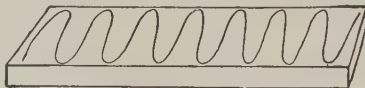


2. Polishing.

only, and gets squeezed through the rag in rubbing. The method of rubbing depends to some extent on the shape and size of the work. First, it is necessary to cover the surface of the wood with polish as quickly as possible. This is done by moving the rubber in large sweeps, either with or across the grain, or both. The direction is not important as long as the polish is rubbed uniformly all over the surface. On a molding, as in picture 2, the movement would be entirely backward and forward lengthwise. On a large, flat surface, as in picture 3, the rubber may be moved in curves or spirals, as shown by the dotted lines. These are only drawn as lines, but the broad surface of the rubber would, in following them, polish the entire area of the wood. On a long surface of moderate width the first movements of the rubber might be as shown in picture 4. For getting into the corners of panels and similar parts the rubber must be squeezed into a pointed form which will reach those parts. After the polish has been applied in this manner, the work must be laid aside for at least a day. Then a second application is given in the same way as the first.



3. Polishing a larger surface.



4. Polishing a long surface.

In the best work this process is repeated a third time or even a fourth, and long periods are allowed between each to permit the polish to sink in as much as it will.

In sinking in and hardening, it generally loses some of its gloss, and as long as this occurs the work can be improved by fresh

applications of polish. This is called "bodying in." There is now only the final process, which is called "spiriting off." In spiriting off, the rubber is moistened with wood alcohol instead of polish, and is rubbed lightly over the surface to remove smears caused by the rubber in bodying in, and also to take up the oil, which, when present, gives the surface a dull, greasy appearance. The last movements of the rubber should follow the grain of the wood—that is, the rubber should move in straight lines with the grain, and not across or in curves.

Lacquer. This is used chiefly for coating polished metal to prevent rust. It is more generally used on brass than on any other metal. Brass does not rust, but soon turns dark and dull if unprotected by lacquer. Before applying lacquer the surface of the metal should be made as bright as possible. When the surface is not bright it is because it has a lot of little depressions and lumps too small to be seen, but their effect is to refract the light in many different directions. When a surface is absolutely smooth, all its parts

receive and reflect the light in the same direction, and a shiny appearance is the result.

This shiny appearance can be preserved for a long time by protecting the metal with lacquer. In time the lacquer wears off from the parts of an article that are constantly handled, or in the course of years it becomes pitted and cracked by the action of the air, which eventually gets at the metal beneath. Until this happens the metal remains as bright as when the lacquer was put on. Lacquer is sold in small bottles and is applied with a camel's-hair brush. It may be obtained either colorless or colored. It is sold in all the primary colors, and these can be varied by mixing. The remarks about the use of the brush in varnishing apply to lacquering also, but in lacquering extra care must be taken to put it on free from dust and air-bubbles, for these allow the air to get at the metal.

When the heating of the metal was a necessary part of the process, lacquering was attended with considerable difficulty, but new and improved methods have made it quite a simple matter. Formerly the lacquers used were practically the same as the varnish which we use on wood, but they are now of a metallic character and are very much better adapted for their purpose.

Though in Europe and America lacquer is used chiefly for coating metal work, in Asia it is used on wooden surfaces and articles made of papier-mâché.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 3247.



MORE WORTHWHILE GAMES

CONTINUED FROM 2887

RELAY RACES—RECORDS OF IMPROVEMENT
WEIGHING, READING AND WRITING FROM THE SCALE

A RELAY race is a great deal of fun. You can play it in many ways. These pictures show you some of the ways. In the first picture, each team has three players. One stands at 1, the next at 2, and the third at 3. You have heard the bigger boys and girls say "Ready-Set-Go," when they start a race. In this relay race, both the children at 1 start to run when they hear the word "Go." Each runs as fast as he can to 2 and touches the next runner there who belongs to his own team. This child is all ready to run on to 3 and touch the last runner there who is all ready to run on to the Finish. The team wins who first gets a child to the Finish.



Did the last child to run win the relay race or did the whole team win it? Yes, it took the whole team to win. That last child could not run until the

one before him reached him, and that second child couldn't come until the first one reached him. Each one had to do his part to win.

THE picture at the bottom of page 3121 shows a kind of relay race called pass ball. The leader of each team passes a ball over his head to the child behind him. He passes it just as quickly as he can but not so quickly as to drop it. Then he runs to the end of the line while the next child is passing the ball on back to the child behind him. Each team tries to get its leader to the head of the line again. So each child works just as fast and just as carefully as he



can. The team wins that gets its leader to the front of the line again. If one child is careless and drops the ball, he may lose the game for his whole team, so each child tries to be both careful and quick.

NOW that you know the rules of a relay race, you can make up ever so many kinds. The children in this picture are playing a writing relay. Choose sides. Each side has a pack of ten word cards. Each leader looks at the first picture, writes the word the picture says and turns over the

card. If the word he has written is like the one on the back of the card the children can read it. When they read it, he shows them his card and puts it at the back of the pile. He goes to the end of the line. The next child takes his place. But if he has made a mistake in writing, he must write the word again correctly before he can go. If he does not see his own mistake any child in the other line who does see it, may challenge him. (Challenge means to tell him he is wrong and have him do it right.) If he writes so poorly that the children cannot read what he has written, someone will surely challenge him. The first line to get its leader again at the head of the line wins the relay race.

Pages 141 to 143 in your Work Book show some writing that was done a few days ago by some children about as old as you.

CAN you write digits as well and as fast as you can write words?

You can say all your combinations of numbers from one to five Just Right now, can't you? And you can say them pretty fast, too. So let's see how well and how fast you can write them. Get a long strip of paper or use the blackboard. Ask mother to help you. Give her your Addition Combination cards from your pocket game and ask her to read them off to you as fast as you can write the answers. If you can't think of an answer, or can't think how to write it just then, draw a line to show you are skipping it and go on to the next one.

Mother will read 3 2 0 3 1 2
 1 2 4 2 1 3 and so on.

YOU write in a column as in the picture, one digit right under the other. As fast as she reads a card she puts it in the back of the pile. When she has read them all and you have written all that you can the best you can, you correct. She will go through the cards again just as before but this time she reads the answer instead of the combination,

4
 4
 4
 —
 2
 5
 3
 —
 5
 —
 3

4 4 4 5 2 5 and so on. You draw a line through every one you left out or did wrong, and mother will keep out that card for you to look at later. Score.

Look at the cards you missed. Write down the combinations. Then ask mother to test you on saying the answers to them and see if you miss the same ones when you say them as when you write them. If you do, just practice on them a little more until you know them. But perhaps you were puzzled only in the writing. Perhaps the 2 and 3 and 5 get a bit mixed up when you write them quickly. Go a little more slowly until you are quite sure of them.

HERE is a way mother can test you on saying the answers. She will use the same cards as before and say the combinations just as fast as you can tell the answers. Every time you say the right answer she puts the card in the Right pile and if you miss one she puts it aside. Then you can look at these after the test and see if you missed the same ones you missed in writing the answers. You wrote

them down, so you can tell. Count the number in your Right pile for your score.

Keep your scores on these tests and try again in a week or two, after you have practiced. You can practice with these same cards. Look at the combination, say the answer just as fast as you can, and look at the back to be sure you are right. First go as slowly as you need to in order to say them all Just Right. Then go a little faster and when you say them Just Right that fast, go a little faster still. But remember, first right—then fast. And to practice the writing, look at the combination, quickly write the digit and look at the back to correct. When you think you can score better than you did on the last test, ask mother to test you again.

Here is a good way for mother to keep your scores in these tests she gives you.

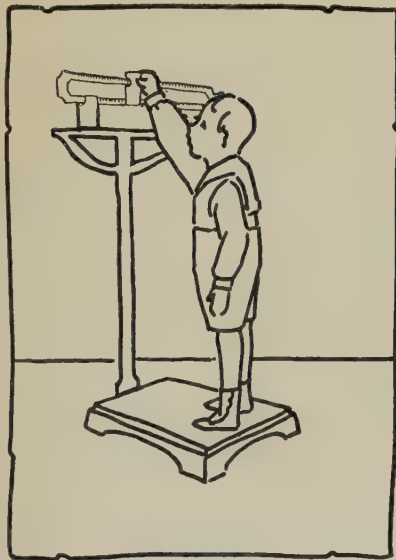
Combinations I know fast and right.

When I say them				When I write them			
	Date		Score		Date		Score
+ 1 to 5	March	4	21-17		March	4	21-11
+ 1 to 5	March	12	21-21		March	12	21-18
+ 1 to 5	March	17					

First is a page with these tests for Addition Combinations. It has a place for the date and the score. 21-17 means there are 21 of these combinations and you had 17 of them right when you said them. 21-11 means that you had 11 of them right when you wrote them. As soon as you think you know any other combinations well enough to be tested on them this way, mother can add pages to your score book for tests. You may have a page for Addition Combinations from 6 to 9 and you can read it yourself if she writes + 6 to 9. + means to add. You may have another page for Subtraction Combinations 1 to 5 and another for Subtraction Combinations 6 to 9. You can tell which are the scores in subtraction and which are the scores in addition for

mother can write the subtraction ones — 1 to 5 and — 6 to 9. — means to subtract.

You remember we said we would not try to play speed games until we could play the other games well. We never run races until we can run quite well. These tests are like races with yourself. You don't want to try them until you know the combinations quite well and can play the other games. But as soon as you do know them right, it is fun to learn them fast as well as right.



CAN you weigh yourself? It will be great fun for you to practice moving the weight along the rod until you find out how to make it balance. Balance means that the rod stays quite still and does not move up or down at all. Then you can read the number on the rod. Look

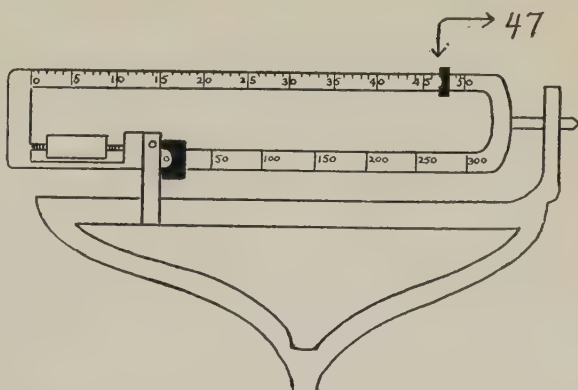
at the picture just below and see the place to read. The number you read, where the weight stops, tells you how many pounds you weigh.

The numbers on the rod are larger than you have learned to read

but you can easily learn them. I should not be surprised if you already know how to

count by tens like this: 10 20 30 40 50 60.

If you can't, ask mother to help you learn to do it. Then make yourself a card with these numbers on it, like the picture you see down in the left-hand corner of the page and practice your counting, looking at the num-



- 60

50

40

30

20

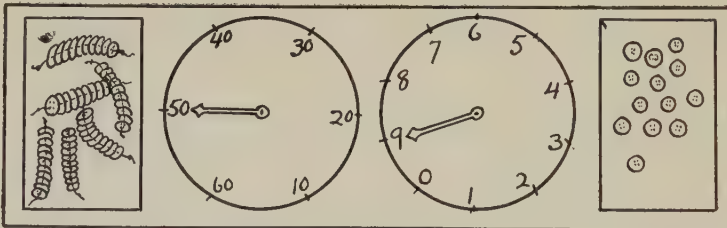
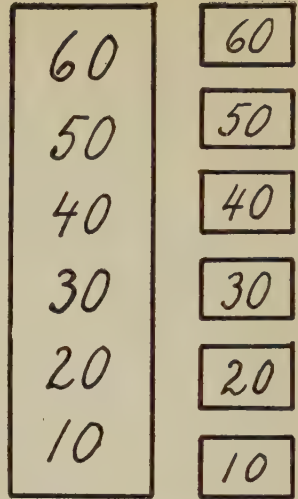
10

bers as you say them. With a little practice you will know what the numbers look like.

Then make yourself a set of cards with these numbers on, one number on each card. Mix the cards up and spread them out on the floor or table, and see if you can pick them up as you count, and put them in the right order. Then look at your counting card and see how well you know these numbers when you see them.

WHEN you know these numbers quite well, try this game to teach you about numbers like 57 42 63 27 19 38 and so on.

String ten buttons or seed pods or something else that is handy for stringing, or put ten sticks together in a bundle with a rubber band. Make up several bundles with ten in every bundle.



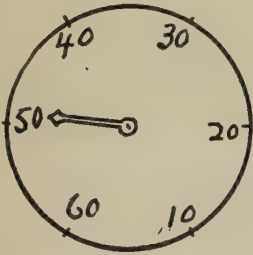
Now you must make spinners, like those in the picture. You have made wheels before, so you know just how to draw your circle, on stiff cardboard, and how to cut it out, and how to put the spinner on with a paper fastener. Make one wheel with numbers 10 20 30 40 50 60 and the other with the numbers 1 2 3 4 5 6 7 8 9 0. You want to have two boxes. Put your bundles of sticks or buttons or whatever you have, into one box, beside the spinner that says 10 20 30 and so on.

Then put some loose buttons or sticks into the other box, by the spinner that says 1 2 3 4 and so on.

Spin both spinners. Take out of each box the number the spinner tells you. In the picture one spinner says 20, so how many bundles of ten will you take out? Yes, two. The other spinner says 5, so take out five more loose ones from that box. Write down your whole score. You know how much two tens are—twenty, so you write 20. 20 and 5 more are 25. This is another way to write it:



$$\begin{array}{r} 20 \\ + 5 \\ \hline 25 \end{array}$$



Now if the spinners look like this picture, how many tens will you take? Yes, five. And the other spinner says 7.

So you have five tens and seven ones. You write it 57. 57 says fifty-seven.

I think you can learn to write all the numbers correctly by practicing a little with this game. When you think you can, ask mother to read you these numbers and see if you can write them Just Right. If you can, you won't need to practice any more. If you can't, keep at it until you can write any numbers like these which mother may ask you.

20 and 3 more

30 and 3 more

60 and 7 more

50 and 5 more

90 and no more

40 and 3 more

80 and 7 more

70 and 4 more

30 and 8 more

40 and 6 more

20 and 5 more

70 and 2 more

WHAT HAVE YOU LEARNED?

CAN you run relay races and play relay games just as the rules of the game say to do it?

How well can you write? Can you write well enough to help your team win in the writing relay?

Can you write as well as the Good one on the writing scale in the Work Book? Can you write better than that? How much better?

Do you know which letters you write best and which you write worst of all?

Can you write digits? Can you write them well enough and fast enough to write the answers in number tests mother gives you?

When do you score better, when you say the answers to the combinations as fast as you can, or when you write them as fast as you can? How much better?

What is your best score in number tests?

Your best score for Addition Combinations through 5?

Your best score for Subtraction Combinations through 5?

Your best score for Addition Combinations through 9?

Your best score for Subtraction Combinations through 9?

Can you count by tens to 60?

Can you write these numbers when mother tests you?

30 and 1 more

70 and 8 more

90 and 3 more

50 and 7 more

20 and 4 more

60 and 6 more



THE NEXT HELPS TO LEARNING ARE ON PAGE 3255.

BIRDS OF THE NORTHERN HEMISPHERE (II)



1. Brown or Tawny Owl. 2. Marsh Hawk. 3. Red Grouse. 4. European Yellow Hammer. 5. Roseate Tern. 6. Spotted Flycatcher. 7. Wheatear. 8. Golden Eagle. 9. Bank Swallow. 10. Dartford Warbler. 11. Blue-headed Wagtail. 12. Goosander. 13. Tufted Duck. 14. Bittern.



1. European Kite. 2. Kentish Plover. 3. Curlew. 4. Blackbird. 5. Pied Flycatcher. 6. Hoopoe. 7. Ring Ousel. 8. Least Tern. 9. Redshank. 10. Short-eared Owl. 11. Cormorant. 12. Grasshopper Warbler. 13. Great Skua. 14. European Stock Dove. 15. Greenshank. 16. Shoveler.



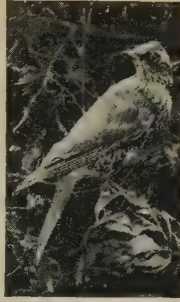
1. Chaffinch. 2. Goldfinch. 3. Great Tit. 4. Gray Wagtail. 5. Wren. 6. Magpie. 7. English Robin.
 8. Green Woodpecker. 9. Bullfinch. 10. European Kingfisher. 11. Nuthatch. 12. English Sparrow.
 13. European Jay. 14. Greenfinch.



1. Murre. 2. Marsh Warbler. 3. Black-throated Loon. 4. Coal Tit. 5. Long-eared Owl. 6. European Quail. 7. Linnet. 8. Willow Warbler. 9. Pochard. 10. Golden-crowned Kinglet. 11. Skylark. 12. Snipe. 13. Lesser Whitethroat. 14. Oyster Catcher. 15. Stonechat. 16. Storm Petrel.



The Great Gray Shrike.



The Fieldfare.



The Crested Lark.

THE LARKS AND THEIR FRIENDS

A BRITISH child of humble birth has a rare possession which the wealthiest American may envy, for America has neither skylarks nor nightingales. The Old World has given the New horses and cattle, sheep and pigs and goats, poultry and pigeons, bees and fruits, along with white men. They have all thrived here past belief, and turn again to feed and sustain and clothe the original givers. But certain gifts America cannot keep, though she would gladly do so.

Numbers of skylarks, nightingales and English robins have been brought to North America. But these natural jewels do not fit into that rich setting. The little songsters vanish here, perishing in the fierce competition they have to face from native birds, or they fly so far asunder, on being released from their captivity, that they never meet at mating time, and die desolate.

And so dwellers in the New World, when they find Shakespeare and Shelley writing in ecstasy of the sweet-throated vocalists of England, experience the same sort of wonder which the English feel when they read of humming-birds, and they envy the children into whose ears these marvelous hymns of praise are poured so lavishly.

There are quite a hundred species of larks, but the one best known is the Skylark. Some birds are foolishly named, but the man who gave this bird

CONTINUED FROM 2976



his title merits our admiration. Skylark! There is the very essence of

homely poetry and music in the name. The little soloist nests humbly amid rough grass or concealed in a wheat-field, but he takes his song near heaven from which it came. He is born in a cluster of grass among the clods, but he springs up into the blue depths of the sky, and makes the sunlit air the platform for his streaming song.

To perfect the rapture the townsman feels in the country he must have a lark singing overhead. And the wonder and splendor of a city may be crowned by the song of this bird. A writer has told of a family of larks which carols blithely all the day within four miles from Charing Cross in the heart of London.

The fact that larks are plentiful near cities where never a blade of wheat is grown, is part answer to the charge that these birds are harmful to the grain. They are seed-eaters, and they do, from time to time, claim a little wheat; but for every grain of wheat that they eat they pay in labor of the most beneficial kind. They are great hunters of insects, and the young larks depend entirely in their nursery days upon thousands of insects for diet. If we are to deny the lark his tiny portion of grain we must censor our poets, for this bird has inspired some of the finest poems ever written.

There are two species of lark which

sing in England. How shall we distinguish the skylark from the Woodlark? In the first place, the woodlark is less common, its range is much more restricted. We are less likely to meet it in the north of England than in Egypt, Morocco, Spain and Central Europe. It is numerous in Devonshire and the southwestern counties generally, and there the puzzle of identity has to be solved.

The skylark has a long two-pointed tail; the woodlark's tail is short and more nearly square. This bird keeps more to woodland bordering its feeding grounds in the fields than the skylark, and though it rises into the air to sing, it does not soar to such heights. The eye might follow the woodlark's song up to a clearly perceptible bird, whereas the skylark rises to such heights that it is but a wandering cascade of jubilation, heard but not seen.

There are few Crested Larks in Great Britain, but the bird is common in Central Europe, where it spends the summer, proceeding south through Spain, presumably to Africa for the winter. No birds could be more shy than these, but once they reach their home quarters in Germany and Hungary they become as confident as sparrows, and hop about the highways of town and village as trustfully as tame pigeons. The few specimens seen in England are probably carried there by winds; perhaps now and again by erratic instinct which carries a bird adventuring out of its course. At any rate, they have never settled there.

THE WANDERING LARK WITH THE VERY SHORT TOES

The same remark applies to the Short-toed Lark from Southern Europe and the Far East. It is rare in England. It is a seed-eater, so it would not be welcome to the farmers. Its name marks a peculiarity of its feet. Why it should be the one member of the Lark Family with very short toes is a mystery as yet unsolved. There must be some advantage in it, or these birds would never have spread across Europe and into India and Turkestan, and even beyond.

This hale and hearty family has its empire in many lands, and not even the grim terrors of the Arabian and African desert repel the Desert Larks. Meagre as the fare is, the larks are there, not in flocks, but as single pairs, severely isolated from rivals, lest all should starve in the general misery and want.

Larks which so closely resemble finches as to be called Finch Larks inhabit arid wastes in Africa and India. Asia has larks which find their dwellings in low shrubberies and are called Bush Larks. Then there are Calandra Larks in Southern Europe, Africa and Asia; an almost entirely black lark in the wilds of the Central Asian steppes; a White-winged Lark ranging from Europe into Asia, once a visitor to England; Shore Larks which teem from Northern Europe westward to the coasts of North America, where they are usually called Horned Larks.

THE LARK THAT SINGS ITS SONG OF HOPE AT HEAVEN'S GATE

Find them where we may, the larks all sing, and are the heralds of happiness. The world may be sad and worn and depressed, but ever a lark is singing, as if to tell us that woes are not eternal, that felicity is about us for the seeking. The larks are the optimists of bird life, and we have need of them. It was Goethe who wrote:

Let your trouble be,
Light will follow dark:
Though the heaven falls,
You may hear the lark.

The larks make life musical; their closest relatives, the European Wagtails, suggest active well-being and tireless industry in which whim and pretense have their share. A pied wagtail on the lawn comically recalls a man dashing for a train and missing it through excess of twists and turns for fussy, purposeless aims. They run, they dart, they flit and fly, and are ever moving.

Energy marks all the tribe—the White Wagtail, which is rarely seen in Britain; the Pied Wagtail, which frequents houses wherever there is a green lawn for hospitality; the lovely Yellow Wagtail, which keeps more to the plow and meadow, drawing nearer and nearer with the advance of summer to the lands that flank the streams; and the Gray Wagtail, which shares with the dipper the sweet scenery and fat fare of mountain, lake and stream.

WHY THE WAGTAIL STRUTS AROUND HORSES AND CATTLE

Nearly all the wagtails, including the handsome blue-headed and yellow-headed species, attach themselves to cattle and horses, darting about between the feet of the animals to snap up the insects disturbed in the grass by the hoofs of the browsing creatures.

MANY SINGERS, SHRILL AND SWEET



Black-backed Piping Crow.



Waxwing.



Mocking Bird.



Catbirds of Queensland.



Wagtail of Australia.



Black Redstart of Central Europe.



White-backed Piping Crow.



Parson Bird of New Zealand.



Shama—the Indian Nightingale.



American Robin.

Pictures by A. Brook, H. Mortimer Batten, W. S. Berridge, R. Chislett and others.

They are a widely distributed group, but not more so than the Pipits. These birds get their name from the sound they make. If some of us mistake them for a species of lark we deserve pardon, for the long hind toe and the general outline do suggest those birds, of which they are near relatives. But they never have their nostrils feathered as in the manner of larks. Except for their soberer plumage, they more nearly resemble wagtails, and certain authorities have it that the pipits are the ancestral type from which the wagtails developed.

**THE PIPIT THAT SINGS IN THE DESERT
AND THE PIPIT THAT SINGS BY THE SEA**

There are many pipits in the Old World, but only two species in America. These are the American Pipit, and Sprague's Pipit. They look very much alike, but differ in their power of song. The second sings in the sky like the lark and is sometimes called the Missouri Skylark. Few birds have a sweeter song. The European Tree Pipit nests on the ground and feeds there; and though he sings a simple lay as he runs through the grass after an insect, it is the high branch of a tree which he prefers for his platform. There his lay begins, though it may end in the air, or be continued as he spirals with taut wings and tail to the ground. The Meadow Pipit seems everywhere.

Its cousin, the Rock Pipit, is the minstrel of the British seashore. Rocks and cliffs are its home, so long as sea be at the foot; and an island not too green will serve for many a pipit mansion. There is no mistaking this bird. Does he sing by the sea? Yes? Then he is a rock pipit, the only warbler by the salt sea. There is a rich banquet spread between tides for him—worms, tiny crustaceans and marine insects—and though the way is rough and stormy at times, he is safer in his privacy than cousin meadow pipit, whose nest is shamelessly invaded by the cuckoo for purposes which we all understand.

**HOW THE PIPITS BAND TOGETHER
TO WAR ON THE CUCKOO**

Meadow Pipits loathe the adult cuckoos and combine fiercely to mob them, yet they take their eggs and rear their youngsters with a passion of devotion not to be excelled. Do they know that the adult birds are unscrupulous interlopers? Or are they, like other little

birds which assail cuckoos, misled by the rascal's hawk-like appearance into mistaking it for a flesh-eater? These problems do not vex the pipit of the rocks; his nest and his babes are safe where the sea wind sings.

Where the pipit darts from the rocks to the shore for breakfast, another bird, small and plain of coat, but with a notably curved longish beak, may be seen foraging on the rocks themselves for spiders and flies and other things of the kind. It is a Creeper, a wee thing vowed to a restricted life, a life sustained by food found on cliffs, rocks, walls and trees, and to be gained, not by flight, but by diligent search on closely scrutinized surfaces. The Wall Creeper is common among the mountains of Central Europe, and ranging through Central Asia and India, where the stranger may reasonably mistake its flickering flight for that of a great butterfly.

The Tree Creeper is more common in Western Europe. It is a delicately built bird, but with long claws which enable it to run over the trunk of a tree with the agility of a monkey in the branches. Every wood and orchard should have its corps of these to rid the trunks and boughs of trees of wicked insects, their eggs and their larvæ. It should be a serious offense to kill one of these. North America has only the Brown Creeper, found in both Canada and the United States.

**HOW THE NUTHATCH GETS THE
KERNEL OUT OF THE NUT**

The nuthatches are a large family, close to the creepers. We delight to see their antics—standing, clinging, right-side-up, wrong-side-up—and the perky confidence with which they pose like exquisite little carvings upon a bough or trunk. One feels affection for these birds because of their grace, their appetite for the parasites harmful to trees, and for the masterly art with which, when nuts and fruits arrive, they take the nuts, wedge them into cracks, and with little hammer blows from their bills smash the shells and so gain the kernels.

The European Nuthatch nests in a hole in a tree, and where the entrance is too large, plasters it up neatly with clay; but the Syrian example makes his nest of earth and stones and other matter, attaches it to the face of a rock, and gives it the neatest little funnel for portal. In

THE NIGHTINGALE, THE ROBIN AND THE LARK



English Robin.



Nest of a Long-tailed Tit.



Male Whinchat.



Thrush Family.



Water Ousel feeding her young.



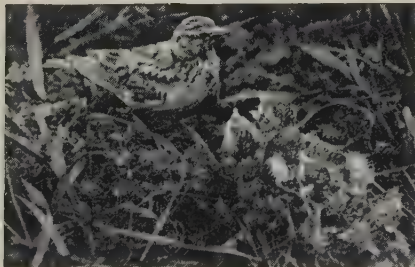
Nightingale on the watch.



The Skylark finds its breakfast.



Nest of a Willow Wren.



Woodlark and her young.



Nest of English Robin.

North America the nuthatches have no such funnels, yet the Australian members of the group make the entire nest funnel-shaped. In India nest-building habits vary. We have several of the family—the White-breasted Nuthatch, the Red-breasted and the Brown-headed. All are much alike in their habits.

From nuts, back a step to honey, and here we find birds ready to live on this sweet provender—Honey-eaters by habits and by name. They are mainly Australasian, or natives of the South Pacific Islands. Whatever the species, they have this in common: they have heavy claws and curiously long tongues, which they protrude so that the feather-like edge may reach to the depths of the blossom. Notable in the group is the Tui, or Parson Bird. The second name is derived, a little foolishly, from its wonderful powers of mimicry. The Stitch Bird is named from its note, as the Four-o'clock Bird is from its curious cry.

THE GORGEOUS SUN BIRDS THAT LOVE THE SUNSHINE OF AFRICA

Other honey-eaters are the splendid Sun Birds, which take the place in the Old World held by the humming-birds of the New. But here the beak, and not the tongue, is long. The bill, curved and delicate, acts as a suction pump in the fountains of nectar into which it is thrust. The same implement serves for the collection of flies innumerable.

Australia and India have sun birds, but the true home of the family is Africa. There the gorgeous Malachite Sun Bird is richly enameled of feather—the sort of bird that a dreamy rajah of the old days would have sought to invent for his gold-decked palace. But equatorial Africa has a bird still more splendid in the Metallic Sun Bird, a creature of fire and fury, as we should suppose. It attacks its rival like a little cyclone; it rejoices in the raging heat of the noonday sun, which other birds avoid.

Indeed, a fondness for more sunshine than is healthful for other birds gives the group its name. They are all fighters, all as handsome as paint, given in the courting season to great length of lustrous tail, which, in the Indian species, gives the bird its name of Long-tailed Sun Bird.

THE OUNCE OF FLUFF AND FEATHER THAT COMES OVER THE SEA

Wherever we go the tits keep us company on the big land masses, throughout

the Old World and in America, where there are a few specialized types; even in New Zealand the tits are present. They are great helps to man, for all of them are insect-eaters in the main. The one charge against them is that they levy toll on the green peas in the garden. But green peas are only their wages for the work they do in ridding the land of parasites.

The Great Titmouse is almost entirely insectivorous; the Marsh Titmouse is as innocent of offense. It is the Blue Tit, master titmouse proper, who brings the family credit into question. He is the little rascal who occasionally insists on seeing what is inside the pod of a pea. But he is the darling of the gardens, the little acrobat of the trees; the confident, perky little fellow who comes with fearless assurance up to windows, and turns himself upside down to feast on the halved coconuts and pieces of fat and suet which are hung up for him.

It is a stirring thought that these mites of life which abound in European gardens make the great overseas journeys like all the other migrants—high-engined living airplanes of less than one ounce! But, tiny as he is, the blue tit has a smaller cousin in the Long-tailed Tit, though, thanks to the long feathers of the tail and the general looseness of the plumage, this little fellow looks bigger than his size. None is more social in habit than this one. The Tufted Titmouse is rather common in southern United States, and occasionally goes to the north.

THE RED-BACKED SHRIKE IS CALLED THE BUTCHER BIRD

We must pass to the shrikes, at whose deeds the bird-lover must pucker his brows; for these birds are killers and eaters of other birds as well as of mice, frogs and insects. Most of them are Old World birds, but in North America are the Northern, the White-rumped and the Loggerhead Shrike. In Europe are the Great Gray Shrike, whose nests are made in Central Europe; the Lesser Gray, Pallas's Great Gray, and the Woodchat Shrike from Central and Southern Europe. The English shrike is the Red-backed Shrike.

The name Butcher Bird, often given, is well deserved. They pounce upon anything not too large for their powers—bird, mouse or grasshopper. They kill their victims with their heavy-toothed

beaks; then impale the dead body on a thorn, to devour it at once, or consume it at leisure when the day's hunt is done.

THE ORGAN BIRD, WHICH TALKS AND WHISTLES BUT CANNOT SING

Border-line relations in the bird world become a little complex at this stage of our journey through the order. We now speak of birds which seem to embody features of both magpie and lark, so as to be called by Australians, Magpie-larks. Next are the splendid Helmet Birds; then the Piping Crows and the Minivets and Cuckoo Shrikes. The piping crows are Australian, and are often called magpies, by virtue of their black and white plumage. They are a remarkable group of many patterns, and include that strange creature the Organ Bird.

That seems a pretty title, but organs can displease when they are out of tune, and the organ bird is one of the untuned. His notes are many and diverse, but woefully unmelodious. Still, Tasmanians love him, for, when caught, he ceases to be inharmonious: he picks up a tune and whistles right merrily, as well as talks with gravity and readiness.

Next come the Waxwings, pretty creatures with the ends of certain feathers of the wings and tail tipped with red, horny appendages resembling sealing-wax. The Bohemian Waxwing is common in Europe, but rather rare in America. The Cedar Waxwing is more common and is often called the Cedar Bird. The Japanese is an Eastern favorite, and the Caroline Cedar Bird is a waxwing too.

The American Greenlets, mainly green in color as in name, are wood-haunting birds. They are more properly called Vireos. There are many species. They lead us to the Wood Swallows of Australia and India, which, though swallow-like, as they fly and feed on winged insects, descend to the ground to eat grubs, which true swallows never do.

JENNIE WREN, SWEET SONGSTER AND DELIGHTFUL ARCHITECT

If in turning from the home of these birds we make a call on South America, we shall find there a great assembly of wrens. But the many species of these birds are scattered widely over the world. None is more familiar than the common variety which we call Jennie Wren, a garden treasure of sober hue but infinite charm. It is blithe of spirit and almost constantly in song; a delightful architect

of nests, boldly confident, not so much that we shall not hurt it as that it has the right not to be hurt.

Jennie is not so ready to make advances as the tomtit and the robin. It takes its place in our midst with a certain minute dignity, if dignity may be possible with that fantastic little up-cocked tail and perky manner. It cares little for our bounty, but forages for itself. Wood-lice are its big game, spiders its tigers, caterpillars its snakes, and they and a host of other things harmful to us are its food. They, like other tiny birds, are marvelously prolific, but when spring comes and wren flocks are thinned, we sadly ask ourselves, Where are the baby wrens of yesterday? The number of deaths must be enormous, or the land would swarm with these exquisite little creatures.

The Golden-crested Wren is the tiniest of European birds, as well as one of the sweetest. Its nest is one of the loveliest little homes ever devised by living thing. All the wrens are great nest-builders. Like the weavers, they sometimes build, for sport and practice, nests which they do not need and may never use.

The uptilted tail of the jolly little Water Ousel suggests at first sight a larger unknown wren. A general look at the outline seems to show it to be a strange little thrush. Probably it comes between the two, related to both. They cannot be so very far removed from the famous Mocking Birds, which are thought by some to be freakish thrushes established as a permanent type. These are wonderful mimics with a little repertoire of their own. They can imitate any sound from the cry of a sheep to that of an eagle.

THE LITTLE BIRD THAT MEWS LIKE A CAT AND CLUCKS LIKE A HEN

The Catbird screams and mews like a cat and clucks like a hen, as well as utters all sorts of whistling cries. The Brown Thrasher has a sweet song of its own. All these birds fly well and feed on the wing.

We pass on to the true Thrush Family, which includes many species. There are the Missel Thrush, the Song Thrush, the Redwing, the Fieldfare, the Ring Ousel, in addition to distinct genera of Rock Thrushes.

We have many thrushes, though we do not call them all by that name. The Wood Thrush is a wonderful singer, and

does not live entirely in the woods. The Hermit Thrush is shy, but its song is among the sweetest we hear. The American Robin is a thrush, and so is the joyous Bluebird, which used to be so common before the English sparrow drove him away. We tell more of them in Birds of the North. The Wheatear, sometimes called the Stonechat, is a thrush, but is more common in Europe than in America. It breeds freely in Labrador, and sometimes straggles southward into the United States.

THE TRAVELERS FROM THE ARCTIC SPEND CHRISTMAS IN ENGLAND

The English often speak of the Redwing and the Fieldfare. They come south in winter with a touch of mystery. They accept hospitality during inclement months, and settle down as cousins of the thrushes. But the same bird which eats a homely Christmas dinner in a rustic English hedgerow has seen great wonders and terrors in the Far North, where it was cradled.

Wheatears migrate every year the whole length and breadth of Europe—some to seize the moors, some the meadows, and some to enliven the beaches and sandbanks of the sea and estuaries. The European Redstart, which is Anglo-Saxon for Red-tail—the bird which country people call Fire-tail—spends the summer months in Northern Europe; the Bluethroat, which, leaving the Sunny South, is in its Arctic nesting grounds by the end of May—these all belong to the Thrush Family. The bird called the redstart in America is a warbler, not a thrush.

DIFFERENT BIRDS CALLED BY THE SAME NAME

The student of both birds and flowers must remember that the same name in Europe and America does not always mean the same bird or the same flower. In most cases they look something alike. When the first settlers came over they saw a bird or a flower which resembled one they remembered in Europe, and therefore they often called it by the name they knew. In fact, it often belongs to quite another family. On the other hand, many European plants have been brought over and have made themselves so much at home that we do not realize that they have not always been here. Many birds are equally at home on both continents. Occasionally an introduced bird, like the English sparrow, thrives.

THE ROBIN THAT MAY HAVE BEEN MAN'S FRIEND AGES AGO

Another genus consists solely of that charming redbreast, the English Robin, common to all Europe and represented by separate species in the Far East. Legend and fancy cluster thick about the beloved robin, but all arise from the fact that his plump little breast is a rich crimson.

The robin is the friendliest little creature of all the wilds. What wild bird but a robin will spring down and perch at the gardener's feet, or hop about the lawn as he mows? It is thought that the little robin began its association with men in the Cave days, when it could fly in at the open door and share their rough fare. The young ones share with their parents till they are able to fend and forage for themselves. Then either they or the old ones must move on, lest all perish of starvation. But they do not kill each other. The loser goes; the winner stays behind.

THE MAGIC OF THE NIGHTINGALE, THE SWEETEST SONG OF ALL

We began with a song at heaven's high gate from the throat of the lark; we end with a song which has thrilled poet, prince and peasant in all ages. It is the Nightingale's. Not unlike a soberly clad, slim robin, this matchless bird winters in Africa, but comes north for its cradle.

It makes a modest little nest in low shrubs and bushes, in copse and wood and hedgerow. When urged by the full ecstasy of song, it stands its ground on a green spray and sings in our face as we halt a yard from it. Night and day it chants while its mate is brooding her eggs. If the finest canary that ever trilled had been glorified immeasurably, such a bird might match a nightingale; no other bird can.

The canary note gives the clue to its melody, and once the note has been memorized it can never be forgotten. One can pause at a coppice where a hundred birds are singing in full sunlight, and pick out the nightingale's, sweetest of all the sweet voices. But at night, when all else is hushed, the world is the nightingale's. He thrills the silence with a song so lovely, so pure, so uplifting to heart and spirit as to make the saddest believe in the beauty and beneficence of the Providence which fashioned these birds to minister to our delight.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 3277.

FAMOUS BOOKS

AN INDIAN TALE BY MAJOR RICHARDSON

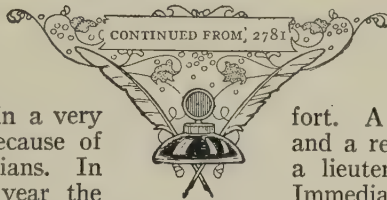
THE lives of the early settlers in North America were in constant danger from Indians. This story by Major John Richardson gives us some idea of the bravery of our forefathers who won the land from its savage owners. Major Richardson, who was born in 1796, had heard from the lips of older people tales of actual experiences in Indian warfare. He had been brought up in the fort at Amherstburg, where Indians were always a part of the scene. No man was better fitted for the task of writing of those thrilling pioneer days. Major Richardson died in 1852.

WACOUSTA

IN the year 1763 English troops had won Canada from the French, but the country was in a very unsettled condition because of the enmity of the Indians. In the summer of this year the western tribes had risen and killed every English man, woman and child in the settlements around the Great Lakes. The garrisons in the scattered forts had escaped for a time, but they had to shut themselves in their forts. Gradually the Indians, under Pontiac, by strategy conquered all the forts but two—Detroit and Michilimackinac.

This story opens in the autumn of 1763. Colonel Charles De Haldimar was governor of the fort at Detroit. His two sons Frederick, a captain, and Charles, a lieutenant, were members of the regiment of Grenadiers attached to the fort. His daughter Clara was visiting her cousin at Michilimackinac. The Colonel's brother, Major De Haldimar, was in command at Michilimackinac, and with him was his daughter Madeline.

One September night the garrison at Detroit was roused by Colonel De Haldimar, who declared a stranger had appeared within the fort and in his own private room. A frantic and thorough search was made, but no trace of the stranger was discovered. One of the officers, Sir Everard Valle-



tort, fired at a figure he saw near an old bomb-proof shelter outside the

fort. A wild Indian war-whoop and a return shot which killed a lieutenant were the results. Immediately after this tragedy

it was announced that Captain Frederick De Haldimar and his servant were missing and that the gate of the fort had been found unlocked. The sentry at the gate, Private Frank Halloway, was arrested on a charge of treason.

A court-martial was called at once. Halloway declared his innocence, but the Colonel would not believe him. Halloway's young wife asked the court to be merciful. But that did not move De Haldimar until Halloway asked for a postponement of the trial for a few hours in the hope that Captain De Haldimar would return. This respite was granted.

But the first light of day showed that Valletort's shot had struck its mark. To the horror of all in the fort, the uniform of the missing captain was distinguished on the crumpled form near the bomb-proof shelter. Sir Everard Valletort was overcome by what had happened, while Charles De Haldimar fainted and was carried to his quarters.

A party was sent from the fort to bring in the body. Then the amazing discovery was made that the dead man

was Captain De Haldimar's servant and that he had been killed and scalped by Indians.

The missing officer had not returned when the court-martial was resumed. Holloway claimed that he was innocent of treachery, but that he had opened the gate at the very earnest request of Captain Frederick De Haldimar. The officer had promised to return within an hour. Holloway claimed that he himself was a gentleman born, and had not enlisted in the army under his own name. Colonel De Haldimar was angry at the claim of the private, and his stern, set face showed his disbelief in the man's story. Holloway had said that the missing captain had crossed the ditch outside the fort by means of a rope attached to a hook in the wall. When a member of the court went to look for this rope, it could not be found. Holloway's last hope was gone, and the unfortunate man was condemned to be shot. In vain poor Mrs. Holloway besought the governor to have mercy. Colonel De Haldimar was as hard as stone.

The execution was to take place outside the fort. As a detachment of the regiment marched to the spot a tall Indian fired at the soldiers from the hut of François, a French Canadian. François claimed he knew nothing of the attacker, but he was taken prisoner, nevertheless, at the Colonel's orders.

While François was being questioned, it was found that the drummer who had marched out of the fort with the detachment was really Holloway's wife in disguise. The poor woman was nearly mad with grief at the fate awaiting her husband and she clung to him piteously. As the firing party was ready to do its duty the attention of all was directed toward the edge of the forest. One Indian was seen to be running madly in the direction of the soldiers. Behind the runner came the man who had fired from the French Canadian's hut. Fierce Indian yells came from the forest. Holloway watched the first runner with eager eyes. Suddenly a cry burst from his lips. The governor gave the signal for the firing party to do its work. As the condemned man begged for a few minutes' reprieve, shots pierced him to the heart. His poor wife threw herself on the body. Then, rising, she cursed Colonel De Haldimar and his whole family. As she fin-

ished her terrible words she fainted. Before anyone had recovered from surprise, the wild Indian, who seemed to be the evil spirit among the savages, had caught hold of her and disappeared in the forest.

Now we must go back to Captain De Haldimar. He had left the fort in disobedience to his father's orders because Oucanasta, an Indian girl, told him that the lives of all the whites in the fort were threatened. He had prevailed on poor Holloway to open the gate, as he had expected to be back in an hour's time. Oucanasta had told him to change uniforms with his servant and to leave his servant at the bomb-proof shelter. Then the Captain followed his guide to a hollow tree, where he heard the chiefs planning to wipe out the forts of Detroit and Michilimackinac by cunning. To the listener's horror, Wacousta, a white man who had adopted Indian ways, appeared with the scalp of the servant De Haldimar had left near the fort. This Wacousta seemed to be more ferocious than any of the other chiefs, and to be more powerful. His was the devilish plan to trap the garrison. In seeking to make his way back to the fort the Captain was made prisoner by Wacousta, who promised him a fearful death by torture. Oucanasta's brother, however, aided the white man. And it was Captain De Haldimar, painted like an Indian, who ran to join the soldiers just too late to save Holloway.

Wacousta, who had discovered the escape of his prisoner, bounded madly in pursuit. But desperation lent wings to Captain De Haldimar's feet. Fortunately the white Indian stumbled, and the officer reached the soldiers.

The plan of the Indians was to attack the two forts on the same day and by the same plan. The tribes, unarmed, would pretend to play a game of ball outside the fort. Their squaws would cluster near the gates. Under each blanket would be arms for some warrior. At a certain signal the ball would be tossed into the fort. When the braves were allowed to enter the walls to find their plaything, the squaws would hand around the weapons. Taken by surprise, the whites, it was thought, would fall easy victims.

Thanks to Captain De Haldimar's warning, the fort at Detroit was prepared. The account of the foiling of the savages we give in the words of the book.

THE FOILING OF PONTIAC

MEANWHILE the white flag had again been raised by the Indians upon the bomb-proof, and this having been readily met by a corresponding signal from the fort, a numerous band of savages now issued from the cover, with which their dark forms had hitherto been identified, and spread themselves far and near upon the common. On this occasion they were without arms, offensive or defensive, of any kind, if we may except the knife which was always carried at the girdle, and which constituted a part rather of their necessary dress than of their warlike equipment. These warriors might have been about five hundred in number, and were composed chiefly of picked men from the nations of the Ottawas, the Delawares and the Shawanees, each race being distinctly recognizable from the others by certain peculiarities of form and feature which individualized, if we may so term it, the several tribes. Their only covering was the legging before described, composed in some instances of cloth, but principally of smoked deerskin, and the flap that passed through the girdle around the loins by which the straps attached to the leggings were secured. Their bodies, necks, and arms were, with the exception of a few slight ornaments, entirely naked; and even the blanket that served them as a couch by night and a covering by day had, with one single exception, been dispensed with, apparently with a view to avoid anything like encumbrance in their approaching sport. Each individual was provided with a stout sapling of about three feet in length, curved and flattened at the root extremity like that used at the Irish hurdle, which game, in fact, the manner of ball-playing among the Indians in every way resembled.

Interspersed among the warriors were a nearly equal number of squaws. These were to be seen lounging carelessly about in small groups, and were of all ages, from the hoary-headed, shrivelled-up hag, whose eyes still sparkled with a fire that her lank and attenuated frame denied, to the young girl of twelve, whose dark and glowing cheek, rounded bust and penetrating glance, bore striking evidence of the precociousness of Indian beauty. These latter looked with evident interest on the sports of the young warriors, who,

throwing down their hurdles, either vied with each other in the short but incredibly swift foot-race, or indulged themselves in wrestling and leaping, while their companions, abandoned to the full security they felt to be attached to the white flag waving on the fort, lay at their lazy length upon the sward, ostensibly following the movements of the several competitors in these sports, but in reality with heart and eye directed solely to the fortification that lay beyond. Each of these females, in addition to the machedoti, or petticoat, which in one solid square of broadcloth was tightly wrapped around the loins, also carried a blanket loosely thrown around the person, but closely confined over the shoulders in front and reaching below the knee. There was an air of constraint in their movements which accorded ill with the occasion of festivity for which they were assembled, and it was remarkable, whether it arose from deference to those to whom they were slaves as well as wives and daughters, or from whatever other cause it might be, none of them ventured to recline upon the sward in imitation of the warriors.

When it had been made known to the governor that the Indians had begun to develop themselves in force upon the common unarmed, yet redolent with the spirit that was to direct their meditated sports, the soldiers were dismissed from their respective companies to the ramparts, where they were now to be seen, not drawn up in formidable and hostile array, but collected together in careless groups and simply in their side-arms. This reciprocation of confidence on the part of the garrison was acknowledged by the Indians by marks of approbation, expressed as much by the sudden and classic disposition of their fine forms into attitudes strikingly illustrative of their admiration and pleasure, as by the interjectional sounds that passed from one to the other of the throng. From the increased alacrity with which they now lent themselves to the preparatory and inferior amusements of the day it was evident their satisfaction was complete.

Hitherto the principal chiefs had, as on the previous occasion, occupied the bomb-proof, and now, as then, they appeared to be deliberating among themselves, but

evidently in a more energetic and serious manner. At length they separated, when Pontiac, accompanied by the chiefs who had attended him on the former day, once more led in the direction of the fort. The moment of his advance was the signal for the commencement of the principal game. In an instant those of the warriors who lay reclining on the sward sprang to their feet, while the wrestlers and racers resumed their hurdles and prepared themselves for the trial of mingled skill and swiftness. At first they formed a dense group in the centre of the common, and then, diverging in two equal files both to the right and to the left of the immediate centre, where the large ball was placed, formed an open chain extending from the skirt of the forest to the commencement of the village. On the one side were ranged the Delawares and Shawanees and on the other the more numerous nations of the Ottawas. The women of these several tribes, apparently much interested in the issue of an amusement in which the manliness and activity of their respective friends were staked, had gradually and imperceptibly gained the front of the fort, where they were now huddled in groups at about twenty paces from the drawbridge, and bending eagerly forward to command the movements of the ball players.

In his circuit round the walls Pontiac was seen to remark the confiding appearance of the unarmed soldiery with a satisfaction that was not sought to be disguised, and from the manner in which he threw his glance along each face of the rampart it was evident his object was to embrace the numerical strength collected there. It was, moreover, observed, when he passed the groups of squaws on his way to the gate, he addressed some words in a strange tongue to the elder matrons of each.

Once more the dark warriors were received at the gate by Major Blackwater, and as with firm but elastic tread they moved across the square, each threw his eyes rapidly and anxiously around and with less of concealment in his manner than had been manifested on the former occasion. On every hand the same air of nakedness and desertion met their gaze. Not even a soldier of the guard was to be seen, and when they cast their eyes upwards to the windows of the blockhouses they were found to be tenantless as the

area through which they passed. A gleam of fierce satisfaction pervaded the swarthy countenances of the Indians, and the features of Pontiac in particular expressed the deepest exultation. Instead of leading his party he now brought up the rear, and when arrived in the centre of the fort, he, without any visible cause for the accident, stumbled and fell to the earth. The other chiefs for the moment lost sight of their ordinary gravity and marked their sense of the circumstance by a prolonged sound, partaking of the mingled character of a laugh and a yell. Startled at the cry, Major Blackwater, who was in front, turned to ascertain the cause. At that moment Pontiac sprang lightly again to his feet, responding to the yell of his confederates by another even more startling, fierce and prolonged than their own. He then stalked proudly to the head of the party, and even preceded Major Blackwater into the council-room.

In this rude theatre of conference some changes had been made since their recent visit, which escaped not the observation of the quick-sighted chiefs. Their mats lay in the position they had previously occupied, and the chairs of the officers were placed as before, but the room itself had been considerably enlarged. The slight partition terminating the interior extremity of the mess-room, and dividing it from that of one of the officers, had been removed, and midway through this, extending entirely across, was drawn a curtain of scarlet cloth, against which the imposing figure of the governor, elevated as his seat was above those of the other officers, was thrown into strong relief. There was another change that escaped not the observation of the Indians, and that was, not more than one-half of the officers who had been present at the first conference were now in the room. Of these latter one had, moreover, been sent away by the governor the moment the chiefs were ushered in.

"Ugh!" ejaculated the proud leader, as he took his seat unceremoniously, and yet not without reluctance, upon the mat. "The council-room of my father is bigger than when the Ottawa was here before, yet the number of his chiefs is not so many."

"The great chief of the Ottawas knows that the Saganaw has promised the redskins a feast," returned the governor. "Were he to leave it to his young war-

rriors to provide it he would not be able to receive the Ottawa like a great chief and to make peace with him as he could wish."

"My father has a great deal of cloth, red like the blood of the paleface," pursued the Indian, rather in demand than in observation, as he pointed with his finger to the opposite end of the room. "When the Ottawa was here last he did not see it."

"The great chief of the Ottawas knows that the great father of the Saganaw has a big heart to make presents to the redskins. The cloth the Ottawa sees there is sufficient to make leggings for the chiefs of all the nations."

Apparently satisfied with this reply the fierce Indian uttered one of his strong guttural and assentient "ughs," and then commenced filling the pipe of peace, correct on the present occasion in all its ornaments, which was handed to him by the Delaware chief. It was remarked by the officers this operation took up an unusually long portion of his time, and that he frequently turned his ear, like a horse stirred by the huntsman's horn, with quick and irrepressible eagerness towards the door.

"The pale warrior, the friend of the Ottawa chief, is not here," said the governor, as he glanced his eye along the semi-circle of Indians. "How is this? Is his voice still sick that he cannot come, or has the great chief of the Ottawas forgotten to tell him?"

"The voice of the pale warrior is still sick and he cannot speak," replied the Indian. "The Ottawa chief is very sorry, for the tongue of his friend the paleface is full of wisdom."

Scarcely had the last words escaped his lips when a wild shrill cry from without the fort rang on the ears of the assembled council and caused a momentary commotion among the officers. It arose from a single voice, and that voice could not be mistaken by any who had heard it once before. A second or two, during which the officers and chiefs kept their eyes intently fixed on each other, passed anxiously away, and then nearer to the gate, apparently on the very drawbridge itself, was pealed forth the wild and deafening yell of a legion of devilish voices. At that sound the Ottawa and the other chiefs sprang to their feet, and their own fierce cry responded to that yet vibrating on the ears of all. Already were

their gleaming tomahawks brandished wildly over their heads, and Pontiac had even bounded a pace forward to reach the governor with the deadly weapon, when, at the sudden stamping of the foot of the latter upon the floor, the scarlet cloth in the rear was thrown aside and twenty soldiers, their eyes glancing along the barrels of their levelled muskets, met the startled gaze.

An instant was enough to satisfy the keen chief of the true state of the case. The calm, composed mien of the officers, not one of whom had even attempted to quit his seat amid the din by which his ears were so alarmingly assailed; the triumphant, yet dignified and even severe expression of the governor's countenance, and, above all, the unexpected presence of the prepared soldiery—all these at once assured him of the discovery of his treachery and the danger that awaited him. The necessity for an immediate attempt to join his warriors without was now obvious to the Ottawa, and scarcely had he conceived the idea before it was sought to be executed. In a single spring he gained the door of the mess-room, and, followed eagerly and tumultuously by the other chiefs, to whose departure no opposition was offered, in the next moment he stood on the steps of the piazza.

The surprise of the Indians on reaching this point was now too powerful to be dissembled, and incapable either of advancing or receding, they remained gazing on the scene before them with an air of mingled stupefaction, rage and alarm. Scarcely ten minutes had elapsed since they had proudly strode through the naked area of the fort, and yet even in that short space of time its appearance had been entirely changed. Not a part was there now of the surrounding buildings that was not redolent with human life and hostile preparation. Through every window of the officers' low rooms was to be seen the dark and frowning muzzle of a field-piece bearing upon the gateway, and behind these were artillerymen holding their lighted matches, supported again by files of bayonets that glittered in their rear. In the blockhouses the same formidable array of field-pieces and muskets was visible, while from the four angles of the square as many heavy guns, that had been artfully masked at the entrance of the chiefs, seemed ready to sweep away everything that should come

before them. The guard-room near the gate presented the same hostile front. The doors of this, as well as of the other buildings, had been firmly secured within, but from every window affording cover to the troops gleamed a line of bayonets rising above the threatening field-pieces, pointed at a distance of little more than twelve feet directly upon the gateway. In addition to his musket, each man of the guard, moreover, held a hand grenade, provided with a short fuse that could be ignited in a moment from the matches of the gunners and with immediate effect. The soldiers in the blockhouses were similarly provided.

Almost magical as was the change thus suddenly effected in the appearance of the garrison, it was not the most interesting feature in the exciting scene. Choking up the gateway, in which they were completely wedged, and crowding the drawbridge, a dense mass of dusky Indians were to be seen casting their fierce glances around, yet paralyzed in their movements by the unlooked-for display of a resisting force threatening instant annihilation to those who should attempt either to advance or to recede. Never, perhaps, was astonishment and disappointment more forcibly depicted on the human countenance than as they were now exhibited by these men, who had already in imagination secured to themselves an easy conquest. They were the warriors who had so recently been engaged in the manly yet innocent exercise of the ball, but, instead of the harmless hurdle, each now carried a short gun in one hand and a gleaming tomahawk in the other. After the first general yelling heard in the council-room not a sound was uttered. Their burst of rage and triumph had evidently been checked by the unexpected manner of their reception, and they now stood on the spot on which the further advance of each had been arrested, so silent and motionless that, but for the rolling of their dark eyes as they keenly measured the insurmountable barriers that were opposed to their progress, they might almost have been taken for a wild group of statuary.

Conspicuous at the head of these was he who wore the blanket—a tall warrior on whom rested the startled eye of every officer and soldier who was so situated as to behold him. His face was painted black as death, but as he stood under the

arch of the gateway, with his white turbaned head towering far above those of his companions, this formidable and mysterious enemy might have been likened to the spirit of darkness presiding over his terrible legions.

In order to account for the extraordinary appearance of the Indians, armed in every way for death, at a moment when neither gun nor tomahawk was apparently within miles of their reach, it will be necessary to revert to the first entrance of the chiefs into the fort. The fall of Pontiac had been the effect of design, and the yell pealed forth by him on recovering his feet, as if in taunting reply to the laugh of his comrades, was in reality a signal intended for the guidance of the Indians without. These now, following up their game with increasing spirit, at once changed the direction of their line, bringing the ball nearer the fort. In their eagerness to effect this object they had overlooked the gradual secession of the unarmed troops, spectators of their sport, from the ramparts; until scarcely more than twenty stragglers were left. As they neared the gate the squaws broke up their several groups, and forming a line on either hand of the road leading to the drawbridge, appeared to separate solely with a view not to impede the action of the players. For an instant a dense group collected around the ball, which had been driven to within a hundred yards of the gate, and fifty hurdles were crossed in their endeavors to secure it, when the warrior who formed the solitary exception to the multitude in his blanket covering, and who had been lingering in the extreme rear of the party, came rapidly up to the spot where the well-affected struggle was maintained. At his approach the hurdles of the other players were withdrawn, when at a single blow of his powerful arm the ball was seen flying into the air in an oblique direction, and was for a moment lost altogether to the view. When it again met the eye it was descending perpendicularly into the very centre of the fort.

With the fleetness of thought now commenced a race that had ostensibly for its object the recovery of the lost ball, and in which he who had driven it with such resistless force outstripped them all. Their course lay between the two lines of squaws, and scarcely had the heads of the bounding Indians reached the oppo-

site extremity of those lines when the women suddenly threw back their blankets and disclosed each a short gun and a tomahawk. To throw away their hurdles and seize upon these was the work of an instant. Already, in imagination, was the fort their own, and such was the peculiar exultation of the black and turbaned warrior when he felt the planks of the drawbridge bending beneath his feet, all the ferocious joy of his soul was peeled forth in the terrible cry which, rapidly succeeded by that of the other Indians, had resounded so fearfully through the council-room. What their disappointment was when on gaining the interior they found the garrison prepared for their reception has already been shown.

"Secure that traitor, men!" exclaimed the governor, advancing into the square and pointing to the black warrior, whose quick eye was now glancing on every side to discover some assailable point in the formidable defences of the troops.

A laugh of scorn and derision escaped the lips of the warrior. "Is there a man—are there any ten men, even with Governor De Haldimar at their head—who will be bold enough to attempt it?" he asked. "Nay!" he pursued, stepping boldly a pace or two in front of the wondering savages, "here I stand singly and defy your whole garrison!"

A sudden movement among the soldiers in the guard-room announced they were preparing to execute the order of their chief. The eye of the black warrior sparkled with ferocious pleasure, and he made a gesture to his followers which was replied to by the sudden tension of their hitherto relaxed forms into attitudes of expectance and preparation.

"Stay, men; quit not your cover for your lives!" commanded the governor in a loud, deep voice. "Keep the barricades fast and move not."

A cloud of anger and disappointment passed over the features of the black warrior. It was evident the object of his bravado was to draw the troops from their defences, that they might be so mingled with their enemies as to render the cannon useless unless friends and foes (which was by no means probable) should alike be sacrificed. The governor had penetrated the design in time to prevent the mischief.

In a moment of uncontrollable rage the savage warrior aimed his tomahawk at

the head of the governor. The latter stepped lightly aside and the steel sank with such force into one of the posts supporting the piazza that the quivering handle snapped close off at its head. At that moment a single shot fired from the guard-house was drowned in the yell of approbation which burst from the lips of the dark crowd. The turban of the warrior was, however, seen flying through the air, carried away by the force of the bullet which had torn it from his head. He himself was unharmed.

"A narrow escape for us both, Colonel De Haldimar," he observed, as soon as the yell subsided, and with an air of the most perfect unconcern. "Had my tomahawk obeyed the first impulse of my heart I should have cursed myself and died. As it is, I have reason to avoid all useless exposure of my own life at present. A second bullet may be better directed, and to die robbed of my revenge would ill answer the purpose of a life devoted to its attainment. Remember my pledge!"

At the hasty command of the governor a hundred muskets were raised to the shoulders of his men, but before a single eye could glance along the barrel the formidable and active warrior had bounded over the heads of the nearest Indians into a small space that was left unoccupied, when, stooping suddenly to the earth, he disappeared altogether from the view of his enemies. A slight moving in the centre of the numerous band crowding the gateway and extending even beyond the bridge was now discernible; it was like the waving of a field of standing corn through which some animal rapidly winds its tortuous course, bending aside as the object advances and closing again when it has passed. After the lapse of a minute the terrible warrior was seen to spring again to his feet far in the rear of the band, and then, uttering a fierce shout of exultation, to make good his retreat towards the forest.

Meanwhile Pontiac and the other chiefs of the council continued rooted to the piazza on which they had rushed at the unexpected display of the armed men behind the scarlet curtain. The loud "waugh" that burst from the lips of all on finding themselves thus foiled in their schemes of massacre had been succeeded the instant afterwards by feelings of personal apprehension, which each, how-

ever, had collectedness enough to disguise. Once the Ottawa made a movement as if he would have cleared the space that kept him from his warriors, but the emphatical pointing of the finger of Colonel De Haldimar to the levelled muskets of the men in the blockhouse prevented him, and the attempt was not repeated. It was remarked by the officers, who also stood on the piazza close behind the chiefs, when the black warrior threw his tomahawk at the governor a shade of displeasure passed over the features of the Ottawa, and that when he found the daring attempt was not retaliated on his people his countenance had been momentarily lighted up with a satisfied expression, apparently marking his sense of forbearance so unexpectedly shown.

"What says the great chief of the Ottawas now?" asked the governor, calmly, and breaking a profound silence that had succeeded to the last fierce yell of the formidable being just departed. "Was the Saganaw not right when he said the Ottawa came with guile in his heart and a lie upon his lips? But the Saganaw is not a fool, and he can read the thoughts of his enemies upon their faces before their lips have spoken."

"Ugh!" ejaculated the Indian; "my father is a great chief and his head is full of wisdom. Had he been feeble like the other chiefs of the Saganaw, the stronghold of the Detroit must have fallen and the redskins would have danced their war dance round the scalps of his young men, even in the council-room where they came to talk of peace."

"Does the great chief of the Ottawas see the big thunder of the Saganaw?" pursued the governor; "if not, let him open his eyes and look. The Saganaw has but to move his lips and swifter than the lightning would the palefaces sweep away the warriors of the Ottawa; even where they now stand, in less time than the Saganaw is now speaking, would they mow them down like the grass of the prairie."

"Ugh!" again exclaimed the chief, with mixed doggedness and fierceness; "if what my father says is true, why does he not pour out his anger upon the redskins?"

"Let the great chief of the Ottawas listen," replied the governor, with dignity. "When the great chiefs of all the nations that are in league with the Ottawas came last to the council the Saganaw knew that

they carried deceit in their hearts and that they never meant to smoke the pipe of peace or to bury the hatchet in the ground. The Saganaw might have kept them prisoners that their warriors might be without a head, but he had given his word to the great chief of the Ottawas, and the word of a Saganaw is never broken. Even now, while both the chiefs and the warriors are in his power, he will not slay them, for he wishes to show the Ottawa the desire of the Saganaw is to be friendly with the redskins and not to destroy them. Wicked men from the Canadas have whispered lies in the ear of the Ottawa, but a great chief should judge for himself and take counsel only from the wisdom of his own heart. The Ottawa and his warriors may go," he resumed, after a short pause; "the path by which they came is again open to them. Let them depart in peace, the big thunder of the Saganaw shall not harm them."

The countenance of the Indian, who had clearly seen the danger of his position, wore an expression of surprise which could not be dissembled; low exclamations passed between him and his companions, and then, pointing to the tomahawk that lay half buried in the wood, he said, doubtfully:

"It was the paleface, the friend of the great chief of the Ottawas, who struck the hatchet at my father. The Ottawa is not a fool to believe the Saganaw can sleep without revenge."

"The great chief of the Ottawas shall know us better," was the reply. "The young warriors of the Saganaw might destroy their enemies where they now stand, but they seek not their blood. When the Ottawa chief takes counsel from his own heart, and not from the lips of a cowardly dog of a paleface who strikes his tomahawk and then flies, his wisdom will tell him to make peace with the Saganaw, whose warriors are without treachery even as they are without fear."

Another of those deep interjectional "ughs" escaped the chest of the proud Indian.

"What my father says is good," he returned; "but the paleface is a great warrior and the Ottawa chief is his friend. The Ottawa will go."

We must leave the actual words of Major Richardson and resume our summary of the story.

The fort at Michilimackinac was to be attacked on the same day set for the attack on Detroit. Colonel De Haldimar's daughter Clara and his niece Madeline were at Michilimackinac. Captain Frederick De Haldimar was deeply in love with his beautiful cousin Madeline. With Sir Everard Valletort he set out to warn the garrison of the other fort. Both officers were dressed as Canadian duck-hunters. François, the French Canadian, had sworn to take them in his canoe by way of the river St. Clair to Michilimackinac. They arrived too late. The fort had been burned down. Clara had been saved and had been put on board the English schooner which had been sailing up and down Lake Huron for months. Madeline had been carried off by Oucanasta, who was dressed as an Indian brave. But she was restored safely to the schooner, where her lover awaited her. The only way the schooner could escape from Lake Huron was through the St. Clair river. (Major Richardson made this river appear much narrower than it really is to make a better story.) An attempt was made to sail through the narrow passage afforded by the river, but Wacousta was in ambush, and the officers and women fell into his power.

An unknown Indian appeared before Fort Detroit and left a bundle. This was retrieved and found to contain a locket Clara De Haldimar was accustomed to wear. Her father took this as a sign of his daughter's death and also of Frederick's death. The appearance of the schooner with Wacousta at the helm seemed proof of the tragedy. But Captain Blessington, who was second in command of the fort, had a brilliant idea. He opened the locket and found on the back of the miniature in it a message from Captain Frederick De Haldimar. This message stated that Clara, Madeline, Valletort and himself were doomed to die within forty-eight hours. Colonel De Haldimar at once began to plan a surprise attack on the Indians.

Meanwhile Clara had found herself a prisoner in Wacousta's tent. The warrior announced that he intended her to be his bride. The demented widow of Frank Halloway was also an inmate of the tent. To Clara's utter amazement, Wacousta referred to her mother.

Then Wacousta explained his hatred

for Colonel De Haldimar and his whole family. As Sir Reginald Morton, Wacousta had been in the same regiment with De Haldimar. They were young men then. The regiment had been quartered in Scotland, and there Morton had fallen violently in love with Clara Beverley, the daughter of a recluse. De Haldimar had not only stolen Clara Beverley from him by treachery, but had trumped up some charges on which Morton was dismissed from the army.

Hearing Wacousta speaking the word "Morton," Halloway's wife regained her reason for a moment. She said Halloway's real name was Reginald Morton. Wacousta also realized that his nephew was dead.

Sir Everard Valletort and Clara made their escape from the Indian encampment, but they were closely followed by Wacousta and Mrs. Halloway. Near the fort the fleeing couple met a band of English soldiers. Wacousta killed Charles De Haldimar, but was himself made prisoner.

At his trial Wacousta acknowledged proudly that he was Sir Richard Morton, the outlaw. But he stated he had been outlawed through De Haldimar's villainy. Colonel De Haldimar condemned Wacousta to death. By a piece of clever strategy Wacousta persuaded his captors to free his hands. With a wild yell he seized Clara and climbed to the top of the very staff erected for his scaffold. The efforts of the soldiers to chop down the staff aided the escaping prisoner. He made the pole sway until it broke at the ax-cuts, and part fell outside the palisade. Wacousta, still carrying Clara, made for the forests.

At noon that day Wacousta stabbed Clara to death and threw her into the river, in sight of all those in the fort. Colonel De Haldimar, thinking all his children were dead and that the curse of Ellen Halloway had come true, retired to his room.

That night, however, Captain Frederick De Haldimar appeared at the fort gate. With him were Madeline, Oucanasta, François and Oucanasta's brother. Frederick and his cousin had escaped through the kindness of Oucanasta and her brother. But when an officer went to the Colonel's apartment to break the news, Colonel De Haldimar was dead.

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 3357.

TOBACCO AND BAMBOOS GROWING



Thriving tobacco plants. Some of these plants measure over seven feet in height.



A tobacco plantation near Havana, in Cuba.



Cultivated bamboos near Nankin, China.



Bamboos growing by the side of a river in Ceylon.

PLANTS USEFUL IN INDUSTRY

WE have already told you of many useful plants—the food, beverage, sugar, spice, medicine and textile plants. There are many others that are of service to man by helping him in his various industries. Some provide colors for his dyes and paints, others yield tanning materials enabling him to change skins into leather, and others give him useful oils, like turpentine, or gums, like resin and benzoin and gum arabic.

Among the most useful of these plants are several species of pine trees that yield turpentine. A little is obtained in Europe, but the chief source of the world's supplies is America. Cuts are made through the bark into the wood of the tree. The crude turpentine then runs from the tree into little cavities cut for the purpose, when it can be collected as a semi-solid substance. About every ten days the bark is cut at a higher point, and so the flow is kept up right through the summer.

This process goes on for a number of years, but the product is best in the first few years after the tree is tapped. The hardened turpentine is often sold as frankincense, though this product is also the gum of several other kinds of trees.

Another substance yielded by the



pinus is resin, or rosin, as it is spelled commercially, which is merely what is left after the turpentine has been distilled. Commercial turpentine really consists of resin mixed with the essential oil of turpentine. There are several grades of resin ranging from the lowest grade, which is almost black, through brown and yellow to an almost transparent grade.

Turpentine is also supplied in small quantities from the terebinth, or turpentine tree, a native of North Africa and the south of Europe. The quantity produced from each tree, however, is not sufficient to make cultivation on a large scale profitable. The tree reaches a height of from twenty to thirty feet.

Gum arabic is a soluble gum obtained from several species of acacia, the best known of which is the gum arabic tree, sometimes called the Egyptian thorn. It is a member of the Leguminous, or Bean, Family, and is a stunted, hard, withered-looking tree, with a crooked stem covered with smooth gray bark. The yellowish globe-shaped flowers develop into long pods containing many flat brown seeds. The plant is a native of Arabia, but it is also found nearly all over Africa. Most of our imports of this gum come from West Africa.

The gum exudes as a liquid from the bark of the trunk and branches, and soon hardens into a solid mass in the sun and air. There are altogether forty trees that yield gum arabic, but most of that used to-day comes from two species only.

A PRICKLY PERSIAN PLANT WITH A VALUABLE GUM IN ITS STEM

Another member of the Leguminous Family which yields a useful gum is the *Astragalus*, a low, spiny bush growing in Asia Minor and Persia, from which we obtain gum tragacanth or gum dragon, used in medicine, for preparing mucilage, and also as a stiffening for calicoes and other textiles. If the stem of the plant be cut across, instead of the usual kind of pith, a wet, gummy mass is found, and it is this which is the tragacanth of commerce. The product is obtained from the plant by making cuts in the bark, when the gum oozes out. The flowers of the *astragalus* are large and yellow, and grow in close clusters at the ends of the branches. A pod develops which has two cells containing kidney-shaped seeds. The plant grows well in temperate climates, but it will not, in such a climate as ours, produce any gum.

A very useful gum resin is benzoin, which comes from the *Styrax*, or *Benjamin*, tree, a native of Sumatra and Siam. This tree, which grows very quickly and reaches a considerable height, has many strong round branches covered with white downy bark. The leaves are oblong and tapering, smooth on the upper surface and downy underneath; and the flowers, which hang in bunches, are grayish in color and develop into a pulpy fruit containing one or two oval compressed nuts.

HOW BENZOIN OOZES OUT OF A TREE AND HARDENS ON THE BARK

The tree begins to yield benzoin usually in its sixth year, though, if the trunk has reached a diameter of seven or eight inches, it may yield earlier. If the tree has not yet grown to this size in six years, it may be later before it yields. A cut is made through the bark where the lower branches leave the trunk, and the benzoin oozes out as a liquid, but soon hardens.

A tree yields about three pounds of benzoin a year, and goes on doing this for ten or twelve years, when it ceases to be of use. The benzoin which first issues after the wounding of the bark is the purest, and is very fragrant and white. Later on the gum becomes brown.

Benzoin is mentioned as far back as the sixteenth century, when it was called *batula* or *Java frankincense*, and its name is a corruption of the Arabic name *luban Jawi*, which developed into *banjawi* and then into *benjoin*. Benzoin, which contains benzoic acid and a small proportion of a fragrant oil called styrol, is used in the manufacture of perfumery and incense. Friar's balsam, or Jesuit's drops, is a tincture of benzoin.

Balm of Gilead, an oily resin from which is prepared the chrism, or anointing oil used by the Church, is a product of the balsam tree, which grows to a height of fourteen feet and yields also myrrh. The wood is white and soft, and is covered with smooth ash-colored bark. There are few leaves and they are very small. The white flowers are scattered upon the branches. The fruit which forms is in the shape of a drupe—a stone fruit like the cherry, which opens by four valves disclosing a smooth nut.

A COUSIN OF THE PARSNIP WHICH GIVES US A GUM USED IN PERFUMES

Opopanax, used in perfumery, is another gum resin that comes from a plant which is a near relative of the common parsnip, and it is often called the rough parsnip. It has a thick fleshy tapering root, and this develops into elliptical fruits that are divided into two parts, containing two seeds with many oil tubes. The *opopanax* of commerce, however, is obtained, not from the seeds, but by making cuts at the bottom of the stalk or in the root, when a juice exudes which hardens into a gum. It is collected and exported from the East in the form either of small round drops called tears, or in irregular lumps.

All these plants are much sought after and cultivated because they yield a gum resin used for various purposes in the arts and industries. Another class of very useful plants includes those that give dyes, and first among these may be mentioned woad, well known as the plant from which was obtained the blue dye with which the ancient Britons colored their bodies.

Woad is a plant belonging to the Cabbage Family which is often found growing wild in England, though it is not really a native of the British Isles but of the Mediterranean countries. It grows to a height of four feet, it has small yellow flowers, and its large woody root pene-

trates far into the ground. It formerly provided most of the blue dye used in England, but was long ago superseded for this purpose by indigo.

Woad is still cultivated in the eastern counties of England and in Scotland for use with indigo to improve the blue used in dyeing the cloth for the uniforms of policemen and postmen. The dye is obtained from the root leaves which are cut, reduced to a paste, and kept in heaps for fifteen days to ferment. They are then formed into balls which are dried in the sun, and after farther fermentation the material is ready for use.

THE DYE THAT WAS LOST AND FOUND AGAIN AFTER MANY CENTURIES

About a ton of woad can be produced on an acre of land, but in very favorable seasons as much as a ton and a half has been produced. The plant needs a constant change of soil.

The Indigo plant, which also yields a valuable blue dye at one time in very great demand, has been largely superseded by chemical colors prepared from coal-tar. The industry of indigo-growing, indeed, had been greatly reduced when the World War broke out, but the difficulty, then, of getting aniline dyes led to a revival of indigo-growing.

This plant has been grown in India from time immemorial, and the dye was imported by the ancient Greeks and Romans. Then, after the Roman Empire broke up, indigo was lost to Europe for centuries. But the Dutch, in the middle of the sixteenth century, again introduced it and Bengal became the chief centre of the indigo industry. South Carolina, Georgia, Central America and the West Indies also grew the plant.

THE GREEN COLORING MATTER WHICH CHANGES TO A DEEP BLUE

There are various species of indigo plants from which the color is obtained, and all are members of the Leguminous Family, to which the pea and bean belong. The plant most used, that grown in the East Indies, has a root about a quarter of an inch thick and a foot or more long. From this root, which has a faint smell resembling parsley, rises a short woody stem two feet from the ground. The plant is bushy and has oval leaves darker on the upper side. The small flowers give place to brown pods containing yellow seeds.

To obtain the dye the plant is cut as

the flowers begin to appear. It then grows up again, and as many as four crops may be gathered in one year. The cuttings are steeped in water for twelve hours, and are then placed in another vat and stirred about until the green coloring matter they contain becomes oxidized and changes to blue. After long boiling and many strainings the particles of dye are separated. They are then dried and pressed into slabs ready for export.

Logwood, from which a useful black dye is obtained, is a tree that grows from twenty to fifty feet high, and is a leguminous plant. It was first discovered in Honduras, where it grows in great abundance, and as early as the days of Queen Elizabeth it was known as a dyewood, though its use in England was forbidden by statute.

The act set forth that "logwood or blackwood of late years brought into this realm is expressly prohibited to be used by dyers, the colours thereof being false and deceitful to the Queen's subjects at home, and discreditable beyond seas to our merchants and dyers." The act was strictly enforced, and all logwood found was seized and condemned to be burned. The explanation was that at that time the English were ignorant of the manner of applying the dye to insure permanency.

THE USEFUL LOGWOOD TREE THAT GROWS RAPIDLY IN MARSHY GROUND

The prohibition was continued until 1661, when a new act stated that "the ingenious industry of these times hath taught the dyers of England the art of fixing colours made of logwood, so that by experience they are found as lasting and serviceable as the colour made with any other sort of dye-wood." Shades of purple, blue, lavender, drab and gray are also obtained from logwood; but none of these can be made permanent like the black.

The tree is rapidly and easily grown, and with careful cultivation a flourishing plantation can be formed in a few years. It thrives in marshy ground, but the soil must not be always under water. The tree is felled when ten years old, and the worthless sapwood hewed off with the bark. The close-grained heartwood is also used as timber and takes a high polish. It contains a crystalline substance obtained by soaking the ground-up logwood in water.

The trunk and branches of the logwood

tree are very crooked and are covered with a dark-colored bark. There are sharp spines on the branches, and the yellow flowers are succeeded by long, double-valved pods containing a number of compressed kidney-shaped seeds.

A SOUTH AMERICAN TREE THAT IS USED IN MAKING RED INK

Brazilwood is another tree of the Leguminous Family which yields dye. There are several species growing in South America and in the East and West Indies, and the dye is obtained from the wood, which when first cut is yellowish or pale red, but becomes darker on exposure to the air. The wood is very hard and heavy, and to extract the coloring matter it is ground up to a powder in a mill and boiled in water. The color, however, is not permanent. Red ink is often made from the brazilwood. As in the case of the logwood, only the heartwood is of use either for obtaining dye or for use as timber.

Two other dye plants may be mentioned here. One is the Madder, a near relative of the coffee tree, which grows in the tropical and warmer temperate parts of the eastern and western hemispheres. A red coloring matter is extracted from the root, which was once much used for dyeing Turkey red, but of recent years this has been largely replaced by aniline dyes.

The other dye plant is Venetian Sumac, a shrub growing in Southern Europe. From the root and stem of it a yellow color is obtained. The sumac plant is useful for another purpose. The bark is very rich in tannin, and this is extracted and used in making the finest kinds of leather. Venetian sumac is often grown as an ornamental shrub. The hairy flower-clusters, which have a fancied resemblance to a periwig, have led to the sumac's being called, in England, the wig tree.

THE MANY INTERESTING WAYS IN WHICH THE BAMBOO CAN BE USED

Among the grass plants is one which is used not for fodder, but for building and furniture-making. Bamboo is a giant grass, and is found growing from the sea-level up to an altitude of nearly three miles. Some species reach a height of over a hundred feet, and are a foot in diameter at the base. It seems a marvelous thing to find a grass with a stem more than three feet round.

Dr. Alfred Russel Wallace, when in Borneo, was amazed at the multiplicity of uses to which reeds of the bamboo could be put. "Their strength, lightness, smoothness, straightness, roundness and hollowness, the facility and regularity with which they can be split," he wrote, "their many different sizes, the varying lengths of their joints, the ease with which they can be cut and with which holes can be made through them, their hardness outside, their freedom from any pronounced taste or smell, their great abundance, and the rapidity of their growth and increase are all qualities which render them useful for a hundred different purposes, to serve which other materials would require much more labour and preparation. The bamboo is one of the most wonderful and most beautiful productions of the tropics, and one of Nature's most valuable gifts to uncivilised man."

He then gives an account of the Dyak houses, not only built of bamboo but furnished throughout with articles made from this wonderful grass. Even the cooking-vessels are of bamboo, and a single reed makes several cups and bowls. In China the tender shoots of bamboo are cooked and served like asparagus. Attempts have been made to manufacture paper from this giant grass.

TWELVE HUNDRED MEMBERS OF THE BIG FAMILY OF PALM TREES

The Palms are a wonderfully useful family of trees, and we have already seen how they yield dates and coconuts, two of the most valuable of vegetable foods. There are, however, many other kinds of palms; in fact, over twelve hundred different kinds have been counted. Many are slender trees whose stems are of the same form as reeds and grasses; that is, they have round stems composed of a pithy part inclosed in a hard rind, and their growth is not marked by rings of wood as in ordinary trees.

An old saying in the East is that there is a use for the palm for every day in the year, and this is almost literally true. The Hindu has gone even farther, and claimed that for one species alone there are eight hundred distinct uses. The Rattan-palm is interesting as being unlike its relatives in that it does not grow erect, not having the necessary stiffness. Dr. Wallace has described the plant which grows in the island of Celebes.

PLANTS THAT GIVE US USEFUL THINGS



The woad, used in dyeing cloth.



The fuller's teasel.



A pine which gives turpentine.



Gum arabic trees at Kordofan in the Sudan.



An oil-palm grove in West Africa.

"The chief feature of this forest," he says, "was the abundance of the rattan-palms, hanging from the trees and turning and twisting about on the ground often in inextricable confusion. One wonders at first how they got into such queer shapes; but it is evidently caused by the decay and fall of the trees up which they have first climbed, after which they grow along the ground till they meet with another trunk up which to ascend. A tangled mass of twisted, living rattan is therefore a sign that at some former period a large tree has fallen there, though there may not be the slightest vestige of it left. The rattan seems to have unlimited powers of growth, and a single plant may mount up several trees in succession and thus reach the enormous length they are said sometimes to attain. They much improve the appearance of a forest as seen from the coast; for they vary the otherwise monotonous tree-tops with feathery crowns of leaves, rising clear above them, and each terminating in an erect, leafy spike rising like a lightning-conductor."

THE IMPORTANCE OF THE OIL-PALM TO THE WORLD OF TO-DAY

The tough supple stems of the rattan are found in homes all over the world, where, split, they are woven into the seats and backs of chairs and couches. The round rattan canes are used for walking-sticks, whipstocks and hoops.

Another palm, the Ivory-palm, produces ivory-like seeds each the size of a hen's egg, and from these buttons and other articles are made. The Oil-palm is a low-growing tree which abounds in West Africa, and the fruits which yield the oil grow in dense heads. The seeds are inclosed in a hard bone-like shell yellow in color. The fruits, after being gathered, are boiled and are then crushed in mortars. Later they are placed in vats filled with water; the oil is trodden out by natives, and then floats on the surface, where it is collected. After being boiled and cooled it is ready for export. In Africa it is used largely as a food, but in Europe its chief use is in the making of candles and soap, and in greasing axles.

An interesting plant cultivated in Europe is the Fuller's Teasel, a relative of the common wild teasel so well known to children in the countryside. The fuller's teasel has a larger head of flowers than its wild relative, and these are imbedded

in stiff hooked bracts. The heads are gathered and set in frames and are used in dressing broadcloth, the hooks catching in and pulling away all the loose particles of wool. Strangely enough, though many attempts have been made, no one has yet succeeded in inventing a machine to do this as well as the teasel heads do it.

THE STRANGE HABIT WHICH SURPRISED THE FIRST EUROPEANS IN AMERICA

Tobacco is a very important crop grown in many parts of the world to-day. It is a native of America, and when the Spaniards first came to this continent they were astonished to find the natives smoking the dried leaves. This practice they soon imitated, and now the habit has spread all over the world.

Tobacco is a tall broad-leaved plant which has a loose cluster of pink or red flowers with funnel-shaped corollas, each drawn out into five points. The flower develops into a pod which contains an enormous number of very small seeds. An ounce of these seeds contains 300,000. Each seed has a hard shell, and it is very difficult for the plant to grow out of this; so, to make the sprouting process easier, the seeds are sometimes rubbed in the hands with powdered emery or ashes.

The seeds are planted in a seed-bed, and when the plants are five or six inches high they are transplanted to the field. When the top of the plant is about to blossom it is removed, and the plant then throws its energy into leaf-making, which is what the grower wants. Side shoots are also removed as they appear. The cultivator watches till the leaves show yellow when held before the sun and are sticky to the touch, and they are then cut and dried for the market.

SOME MEMBERS OF THE POTATO AND TOMATO FAMILY

It is interesting to know that the tobacco plant is a member of a large and important family that includes such different members as the potato, the egg-plant, the belladonna, or deadly nightshade, the mandrake, supposed by the ancients to possess magical powers, the capsicum, which gives us chillies and cayenne pepper, the thorn-apple, and the luscious and wholesome tomato. Jamestown weed, bittersweet and henbane are a few of the many members of this great family that grow wild with us.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 3261.

The Book of Familiar Things

WHAT THIS STORY TELLS US

WHO has not, at some time or other, felt a thrill of dread upon hearing the clanging of a fire alarm? At any rate there are few to whom it does not bring a quickening of the pulse. The fear of fire is an old one, so deeply rooted in the past that small children feel it by instinct, even though they may never have seen a house ablaze. All animals, except those which have associated with man for a long time, seem to have this fear also. You have read of hunters keeping wild beasts away from them by building a fire, or even making a circle of fire around them. Yet fire seems to have a fascination for some small creatures, and they sometimes run or fly into it.

WHEN THE FIRE ALARM RINGS

FIRE cooks our food, keeps us warm in winter and makes the steam which turns the wheels of our industries. Nature gives us no more useful servant than this fiery child. But let the master turn his back for a moment and the slave leaps up in rebellion, hungry to devour and to destroy.

While man lived in caves or tents the danger was not so great. When he began to live in wooden houses and began grouping them together into towns and cities the enemy began to be more dangerous. All through history we find accounts of conflagrations that wiped out cities. When the enemy had gained a foothold the people were helpless; all they could do was to gather together as much of their valuables as they could carry and flee to the open country for safety.

The Romans first attempted to offer resistance to these terrible raids. Possibly their experience in fighting their human enemies suggested it to them. Probably it occurred to them that the same methods could be employed successfully against both enemies. At any rate, Rome was the first city to organize a regular fire department, which at one time numbered seven thousand. Could we have a moving picture of a great fire in Rome two thousand years ago, it would probably present to us a scene not very different from those we sometimes witness to-day. The houses in the poorer and more popu-



lous quarters of Rome were usually built of wood. Each family kept a fire burning on an open altar in honor of the domestic gods, and no wonder fires frequently broke out.

The householder would rush into the street shouting, but there were no alarm boxes to which he could turn. Instead there were men stationed along the streets known as *nocturnes*. From one nocturne to another the alarm would be shouted along the line until it reached the nearest *castra*, or fire-house. Then all the human alarm boxes within hearing would rush to the scene of the fire and become policemen. Just as the police do at our fires, they would drive back the gathering crowds and establish strict fire-lines.

Not many minutes would pass; then, above the murmuring of the crowds would rise the distant sounds of shouts and the quick tramp of feet. The *nocturnes* would rapidly clear an opening through the crowds, and through the passage would charge a centurion heading a company of firemen in metal helmets and leather jackets and trousers. Some would be bearing *siphones*—wooden hand-pumps that worked like syringes; others would be armed with axes, hammers, saws and iron bars; while still other groups bore short ladders so made that their ends fitted and could be clamped together to form a means of

ascent to the tops of the highest buildings they had then.

After these would follow the main mass of the firemen, the *aquarii*, numbering hundreds, each carrying a light earthenware vase. The *aquarii* would immediately form into chains to the nearest cistern, supplied from the great aqueducts leading into the city, and presently the jars would begin emptying a stream of water into the hand-pumps.

THE FIRE CHIEF FINALLY REACHES THE SCENE

Suddenly a chariot would dash through the passageway bearing the *prefectus vigilum*—the fire chief—who would assume command. Surgeons, too, would be in attendance. There were three attached to each fire-house. The pillow-bearers, each four carrying a huge leather pillow at least four feet square and stuffed with feathers, were on hand. Should anybody appear in the upper windows of the burning building the pillow-bearers would drop their pillows below the windows. Upon them the imprisoned inmates of the building might leap. There are expert fire-fighters to-day who say that nothing has ever been invented that serves its purpose better than the life-saving pillow of the old Roman fire department.

Last to arrive would be the *questionarius*, the most feared and respected of all the Roman fire officials. As his title indicates, even to those who do not know Latin, his business was to ask questions, but to many his questions were anything but comfortable. How did the fire start? Was it accident or carelessness? For the Roman laws demanded that responsibility must be fixed for every fire. It was the business of the *questionarius* to fix the responsibility. He established a court of inquiry even before the flames had been subdued. Only recently modern cities in this country have taken example of old Rome and appointed officials whose duties correspond to those of the *questionarius*; these officials are known as fire marshals.

SOME GREAT FIRES OF WHICH WE KNOW

When the Northern barbarians destroyed Rome many of her institutions were lost to the world. During the Middle Ages men thought more of war and destruction than of saving lives and

property from the flames. Great fires were thought to show that God was angry. Berlin was destroyed in 1405; Moscow, Lisbon, Venice, Vienna and Copenhagen suffered enormous and disastrous fires. Constantinople was entirely or partly wiped out a dozen times. London was again and again laid waste, notably in the years 798, 1087, 1132, 1212 and in 1666, the last being the "Great Fire," which burned for four days and destroyed 13,000 houses and public buildings covering 436 acres. Samuel Pepys in his famous Diary shows how helpless the people were. In the hope of checking the onward sweep of the flames, houses were blown down with gunpowder across those sections toward which the wind was blowing the flames, that they might find nothing to feed upon.

The Great Fire of London seems to have waked the people to the need of something at least approaching a fire department. Immediately afterward officials were appointed whose business it was to devise some means to check future fires. The hand-pump was brought into use again. Volunteer fire companies, too, were organized, just as they are to-day in our villages and small towns.

FIRES HAVE ALWAYS BEEN DESTRUCTIVE IN AMERICA

In the colonies in America the problem of checking fires was even more serious than in the mother country, for here, because of the vast forests so close at hand, the houses were built almost entirely of wood. One of the first fire companies to be organized was founded in Philadelphia in 1736. Benjamin Franklin was one of the four chiefs. Each member was expected to furnish, at his own expense, six leather buckets and two stout linen bags. The buckets were intended for throwing water on the flames; the bags were used as receptacles for whatever valuables might be saved from the burning buildings. In New York similar fire brigades were organized, and it became quite the fashion for the young men of the city to join them.

SOME EARLY FIRE-FIGHTERS IN NEW YORK

The apparatus of these early fire brigades was very simple. Everybody has seen the old prints depicting fire scenes of that period; the eight or ten men working the old hand-pump; one or two men

squirting a stream of water on the flames from a hose not much thicker than that used in a garden; and the two chains of firemen between the pump and the nearest source of water supply passing the buckets to and fro.

The invention of the steam engine brought about a change. With steam-driven machinery big pumps could be employed, capable of throwing powerful streams of water against burning buildings. The first steam fire pump was used in England in 1829. Its first appearance was ridiculed, and the name "steam squirt" was applied to it. Even so was the first steamship laughed at. Yet the "steam squirt" was the first of the modern apparatus used to-day.

STEAM ALSO INCREASES THE DANGER FROM FIRES

Steam has also increased the danger from fires. Railway locomotives shower sparks on shingled roofs, factories and warehouses; and cheap lumber encouraged more than ever the building of wooden houses. The invention of matches, one of the most common origins of fire, soon followed, and also the use of petroleum for lighting. Meanwhile smoking was becoming more common.

In Europe these changes did not increase the danger to the same extent as on this continent, for there the houses were built largely of stone and brick because of the scarcity of timber. On this side the risks multiplied tenfold. The white and yellow pine, the principal material used in the building of houses, was especially quick to burn. There were no laws about building.

Men said that the city had no right to tell a free-born citizen how he should build his home. And if John Smith & Company chose to erect a wooden warehouse in which to store cotton or barrels of petroleum, whose business was it but their own? If they were willing to run the risk of fire, from which they would suffer most, who had the right to interfere? It is only of late years that we are beginning to realize that personal liberties must not endanger the welfare of our neighbors.

GREAT FIRES IN THE HISTORY OF CANADA AND THE UNITED STATES

From early times this continent has been the scene of big fires. Quebec suffered in 1815, 1845 and 1866. New York had serious fires in 1835, 1845 and

1856. St. John, New Brunswick, was seriously damaged in 1837 and again in 1877; Pittsburgh was almost wiped out in 1845; Montreal had terrible fires in 1850 and 1852. The greatest fires of modern times have been the Chicago fire of 1871, the Boston fire of 1872, and the San Francisco fire of 1906. Charleston, Philadelphia, Savannah, Portland, Baltimore each has a fire history. Where a European city has suffered disaster once or twice a century, American cities suffered three or four times.

With the same energy that had been employed in building, the people set about organizing means of protection against the danger. Need calls forth invention. The pressing need of fire-fighting apparatus caused the improvement of European inventions and the development of new machines. Another fire danger peculiar to this continent was the tall buildings that were being erected in the cities. This called forth the invention of the water-tower, which would be almost unnecessary in most European cities.

THE LARGEST FIRE DEPARTMENT IN THE WORLD

No wonder, then, that New York, with its skyscrapers, should have the biggest and most expensive fire department in the world. While buildings were limited to three or four, or even five stories, it was comparatively easy to deal with fire. When they began shooting fifteen, twenty, and even forty stories into the air, it was another question. At first there was some talk of passing laws against the erection of such high buildings, but finally the engineers found a solution.

They got the idea of building pump-houses in which could be installed gigantic steam pumps so powerful that they could throw streams of water from the nozzles of hoses with almost the same force that a shell is fired from the mouth of a cannon. These pumps would be connected with the entire water system throughout the section of the city in which the skyscrapers were situated.

When the first test of the high-pressure system was made, the pump stations, five in number, each made a delivery of 18,000 gallons of water a minute. Some of the individual pumps discharged as much as 3,800 gallons a minute. So powerful is a stream of water from a high-pressure hose that it can make a

brick wall crumble as though struck by an explosive shell. By raising the stream at an angle of 80 degrees it could easily reach the top of the highest apartment house in the city.

HOW FIREMEN ARE CHOSEN FOR A GREAT DEPARTMENT

Firemen are chosen very carefully. First, the applicant for the position must pass the mental test set by the Civil Service Commission. Then he must pass a strict physical examination. His body must be strong and as nearly perfect as possible. After he has been passed by the doctor he must undergo the test for muscular strength. The candidate must hang suspended from the rung of a horizontal ladder by his hands, then pull himself up till his chin is above the rung; he must perform this feat fourteen times. Next a dynamometer is used to test the strength of the leg and back muscles and the joints of the knees. Finally there are various jumping feats to perform. Then he may be put on probation.

HOW FIREMEN ARE TRAINED IN A FIRE COLLEGE

He must first attend the college training school for probationers; like the soldier, he must undergo a period of drill before he is sent out on the firing-line. At the school the recruit is assigned to one of the drill squads and gradually broken in. He is taught to handle, raise and balance the ladders before he is allowed to use them. As the ladders weigh from twenty to sixty-five pounds, and range from fourteen to twenty feet in length, it can be seen that it takes experience to handle them. After the novice has mastered this he is made to climb to the first window, then to the second and, as his nervousness gradually leaves him, he mounts to the top.

Next, the young fireman is taught how to build a "chain" of ladders hanging from the windows, up to the top. A man is stationed at each window. In this drill, when the first man reaches the first window he fastens himself to his ladder by means of a large steel snap attached to a strong canvas belt about his waist. Then he reaches down and pulls up another ladder, passed to him by the man below. At the top of each ladder is a long hook which just fits over the sill of a window. The first man raises the second ladder and hooks it into the window above him, after which he climbs it,

swinging like a monkey on the bough of a tree. And so the chain is built, each man coming up from below carrying one ladder for the chain.

There is, indeed, need for iron nerve, for it is no human enemy that this fire army of New York must fight. The dangers to which firemen are exposed may not seem so picturesque as those which soldiers must undergo on the firing-line, but, considering the smaller numbers engaged, the killed and wounded are quite as many. Only too often does a company return to the fire-house after a fire with one or more of its members missing.

WHAT FIRES ARE THE MOST TO BE DREADED?

It is not always the fire that goes roaring through the roof of a building, lighting up the streets for a mile around, that presents the most danger. It is in the dull, smoky cellar fires that the fireman is most often overcome by smoke or gas. Then there is the awful "back draft," which every fireman soon learns to dread. Dashing up the stairway of a burning building, dragging the hose after them, the men come to a closed doorway. With axes they smash in the door. The smoldering fire within is exposed to view—and to the inrush of fresh air. For a moment there is an awful pause; then, as the oxygen strikes the fire the whole room explodes into a roaring flame. Out through the open doorway leap the fiery tongues as though flashed from the mouth of a cannon. The experienced fireman instinctively falls flat, his face in his hands, ducking the blow. But many a man has been killed or horribly burned by back draft.

The falling wall is another common danger. Sometimes a brick wall will buckle in the middle and crumple, dropping like a curtain. The tumbling bricks are then easily dodged. But quite often the whole wall will fall straight out, reaching across the street and remain almost solid until it strikes the ground. This is the kind that kills or cripples whole companies.

Broken glass and molten lead are other perils met with at almost every fire. All through the department are found men bearing scars from wounds inflicted by glass splinters. And again they will enter large buildings not yet in full flame, encounter thick smoke and lose the way out. In such a case the experienced fire-

EARLIER DAYS IN FIRE-FIGHTING



Steam fire engines supplanted the old hand engines just as motor engines are supplanting steam. Here is shown one of the old hand engines, which was drawn by the firemen themselves, generally volunteers. The water was pumped by raising and lowering the bars at the sides which we here see lifted out of the way. The men holding the rope are the old volunteers, some of them now quite old men.



This is an early type of steam fire engine used in the New York Fire Department about 1865. It was called a "Harp Tank" from the shape of the space between the boiler and the front. This engine, small as it is, marked a great advance over the hand-pump shown above.

Lower pictures on pages 3161, 3163 and 3166, and upper picture on page 3165 from A. Dreyfous.

man immediately drops down beside his hose and follows it to the entrance.

FIRE-FIGHTERS WHO WORK ON THE WATER

We have likened the five thousand men of the New York Fire Department to an army, but there is a section of it which should rather be compared to the navy. In New York, as in all cities on the water, there are certain sections which cannot be easily protected by fire-fighters on land. That is the shipping district. Docks reach out a fifth of a mile into the river or the bay, and on some of them are big warehouses filled with goods. Great ships lie beside them. On catching fire a ship may have its mooring lines burned through and then drift out of the reach of the streams from the fire hose. What adds to the danger of water-front fires is the fact that a fresh breeze is often blowing in from the water, ready to fan the flames inward. And a fire can be fought most effectively from the windward side.

To protect its shipping, New York maintains a fleet of fire boats, really floating fire engines. At first glance one of these fire boats might well be taken for a torpedo boat, for the brass-headed hose connections along the side of the deck-house and the formidable-looking stand-pipes, or "monitor nozzles," as they are called, mounted fore and aft, give the appearance of naval armament.

THE POWERFUL FIRE BOATS OF NEW YORK

Each of these marine fire-fighters is moored at a dock alongside a house erected especially for her crew. This building is fitted up like any other fire-house; sleeping quarters upstairs, sliding-poles by which the men can descend quickly to the ground floor, and a full set of telegraphic instruments by which the company may be informed of all the alarms that are sounded throughout the city. The boat itself lies with steam up at all times, ready to speed away on business, whether it be to a burning ship, a lighter in midstream, or a burning coal bunker at the other end of the city.

These boats are built of steel throughout, and the deckhouse and wheelhouse are made of cement; there must be no woodwork about them that could ignite, for sometimes they are obliged to approach very close to a fire and deliver their streams at close quarters.

One of these fire boats, the New Yorker, can throw 12,000 gallons of water a minute at a blazing dock. The water, of course, is pumped up from over the side, up into an air chamber, which equalizes the pressure, then into a twelve-inch pipe which runs all around the boat just below the deck, from which there are forty-two outlets for hose connections. The largest is six inches in diameter. Some of these lead to mounted nozzles resembling machine guns, two of which are on top of the wheelhouse. From these water can be thrown over three hundred feet. With all her power the New Yorker can bombard a burning ship or warehouse with a veritable cascade, which only the biggest blazes can withstand for long. One blow from her monitor nozzle stream can make a hole in a brick wall.

Almost laughable is the fact that each of these boats, in spite of its being built especially for going into the very midst of the flames, must carry a row of fire buckets in its wheelhouse. Such is the regulation applying to all boats plying New York harbor. Since laws must be applied to all alike, no exception can be made in favor of the fire boats.

A TERRIBLE WATER-FRONT FIRE WHICH ONCE RAGED

Perhaps the most brilliant service of the fire fleet was during the disaster that occurred in 1900. A fire started on one of the piers on the New Jersey side of the Hudson River alongside which the German passenger ship Saale was moored. In less than fifteen minutes the flames, fed by stores of cotton, turpentine and oil, swept from pier to pier. A strong breeze was blowing at the time. Before anybody realized the danger a quarter of a mile of docks and ships was ablaze. The Saale and four other big German passenger ships were crowded with visitors. Before the crowds aboard realized what was happening they were in the midst of roaring flames.

Whether they were cast loose by their crews or whether their mooring lines were burned through, the four big steamers, crowded with people, drifted out into the river. Hundreds jumped into the water. Some of these were rescued by tugboats and other craft, but most of those on board were forced down below. The port-holes were too small to permit of their escape, and most of them perished. Al-

HORSE AND MOTOR FIRE ENGINES



No sight is more thrilling than a fire engine on a city street. The galloping horses, with sparks flying from under their feet, the clanging bell, the whistle, the smoke pouring from the engine, all unite to make an impression which is never forgotten. In most cities horse-drawn engines have been supplanted by motor-driven engines like that below. An engine like this has become rare.



The newest fire engines are powerful motor-driven vehicles. When the fire is reached, the same engine pumps the water. Though these engines reach the fire much more quickly, and pump more water than the horse-drawn engines, many are sorry to see the horses go. The new is less picturesque than the old. Some of the new engines can go as fast as a racing motor car, though they seldom do.

together over four hundred people, mostly women and children, were burned to death.

But it was the fire fleet that saved these drifting conflagrations from setting ablaze the whole shipping district on the New York side. One of the burning steamers, the Bremen, drifted across the river and set fire to a wharf, then to a lighter. One after the other the fire boats quenched these blazes. Finally they were able to give their whole attention, to the four great steamers blazing in the river, pouring whole broadsides of water into them. Had it not been for their service there can be no doubt that one of the biggest fires in the history of any seaport would have swept the New Jersey and New York shores of the Hudson River.

WHY SUCH FIRE DEPARTMENTS ARE NECESSARY

One cannot help being proud of the brilliant fights that the firemen have made. But if we think a minute we shall see that there is very little to be proud of. Why is it that in North America fire destroys so much property? The yearly loss amounts to over hundreds of millions of dollars; about three dollars for each man, woman and child of the population. The average for European cities is much less than a dollar.

The answer is that in Europe they apply the old proverb that an ounce of prevention is worth a pound of cure. First of all, European cities have passed very strict regulations in the building of their houses, especially in limiting their height. There the people recognize the right of the city to dictate to its citizens of what material they shall build houses or factories. We, too, have begun to learn this lesson.

WHY THEY HAVE FEWER FIRES IN EUROPE

Another reason why the cities of Europe suffer less is that they follow the example of ancient Rome. The office of *questionarius* plays an important part. Probably most of our fires are caused by carelessness. The Europeans will not tolerate this as an excuse. They regard carelessness which endangers the lives and property of the city as a crime, and punish it accordingly.

We, too, are adopting this method of prevention. Many of our cities now have appointed fire marshals whose business

it is to "ask questions." We are indeed learning that prevention, rather than heroic fire-fighting, is the solution of our fire problem. "An ounce of prevention is worth a pound of cure."

HOW FIRES MAY BE PREVENTED

There are many ways by which the loss from fire can be prevented, some of them easy and some more difficult. One way is to build houses that will not burn so easily. Wood has been scarce for a long time in Europe, and most houses there are built of brick or stone. In America wood has been so much cheaper that most houses in the country or in small towns and cities have been built from the product of the forests.

Another cause of many fires is bad workmanship. The mason who is building a chimney does not always take the trouble to be sure that the chimney is tight. Then some day when there is a hot fire in the furnace, stove or fireplace a spark goes through the crack and the house burns. Sometimes men who put in electric wires are careless, and when wires rub together a fire may begin. In some cities all electric wires must be placed in metal tubes.

HOW EACH ONE OF US MAY HELP TO PREVENT FIRES

Another reason why we have so many fires is that so many of us are careless. Matches are so cheap that we use more than any other people, and too often we throw one away without being entirely sure that the flame has gone out. Many people are careless enough to throw burnt match sticks into waste baskets. Thousands of fires start in this way. People are often foolish enough to light matches where gasoline or kerosene is stored. The fumes of gasoline may catch fire though the flame is several feet from the liquid. That is the reason why smoking is forbidden in garages. Kerosene does not vaporize so easily.

Perhaps we drop one of the old-fashioned kind and someone steps on it; or matches are left where mice or rats can get at them. It is very easy to keep matches in a metal box or in a jar, but very few people take this trouble. If we used only safety matches there would be fewer fires. If we do carry ordinary matches about with us we should always keep them in a metal box.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 3317.

WITH WATER-TOWER AND HAND HOSE



The water-tower is a valuable aid in fighting fire. On the way to the fire, it lies flat on the truck. When the fire is reached, it is raised and extended to the desired height. It can then send the water directly on the fire even if it is far back in the building. Another nozzle is on the truck.



Firemen attack a fire from every point. Some drag hose into the building if possible; others direct the water-tower or send streams from the ground of an adjoining building. Here we see two firemen holding with difficulty the nozzle of a hose which has been carried to the top of an adjoining building.

SAVING LIFE A FIREMAN'S DUTY



Such a scene as this is in the day's work of a fireman. If the stairway is blocked a ladder is run up to a window, firemen clamber up and bring out any who are helpless from age or sickness or who have been overcome by smoke. We see them here bringing down someone from the third story. The firemen make many daring rescues every year. Sometimes they save many in a single day.



This is one of the latest developments in rescue work. The men of the smoke squad wear helmets which cover their heads and faces entirely. In their backs are cylinders to generate oxygen and purify the air which the men breathe out. Thus equipped they can without suffering any harm go into a building, though it be filled with the thickest smoke or even with poisonous fumes.

FIGHTING FIRE IN ZERO WEATHER



In cold weather when the wind is blowing, the spray may freeze as it falls, and thus add greatly to the discomfort of the firemen and to the difficulty of the task. Here we see both engine and firemen covered with ice. One moment the firemen may be exposed to excessive heat, the next moment to cold which chills them to the bone. Such discomfort is accepted as a matter of course.



One of the most destructive fires in many years destroyed the Equitable Building in New York in January, 1912. The fire was discovered during the night, and the loss of life was small. In spite of all the efforts of the fire department the property loss was enormous. Traffic was suspended on Broadway for several days, and trains in the subway were stopped.

ALMOST CONQUERED BUT NOT QUITE



Some of the worst fires occur in the coldest weather. This fire is almost out, but several streams of water are still playing on the building from lines of hose which have been carried through the building across the street. The hook-and-ladder truck has been frozen to the ground and almost buried by the ice which formed while the water was being poured into the building. The fire may smolder for days.

THE GUARDIANS OF THE HARBOR

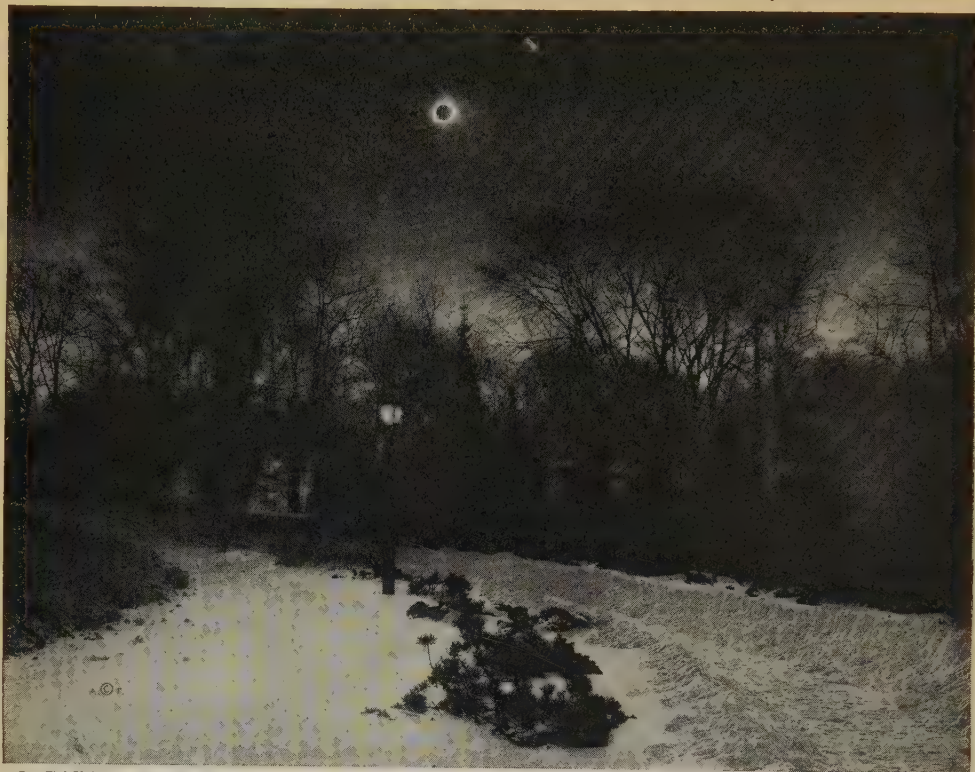


Some of the piers in New York harbor are a fifth of a mile long, and a fire near the end, or on a ship lying beside the pier, cannot be fought to advantage from the shore. These fire boats are swift, and since they have an unlimited supply of water, can drown out any ordinary fire.



In 1900 fire broke out among the liners at their piers in Hoboken, opposite New York city, and raged fiercely. The cables which held the ships were burned, and the great vessels swung out into the stream. One drifted across to New York, and the piers there caught fire. But for the wonderful work of the fire boats it is probable that both cities would have suffered a disastrous conflagration.

TOTAL ECLIPSE OF THE SUN, 1925



A TOTAL eclipse of the sun is so important an event to astronomers that they make ready for it months before the date, going half round the world, if necessary, to be on the right spot at the right moment to make observations. Then, if even a small cloud drifts at that very moment between them and the sun—what dismay and disappointment!

For it is only occasionally that the moon is at just the right distance (that is, less than 218,000 miles) from the earth's surface, when it comes between us and the sun, so as to throw its shadow upon some part of our globe. The band covered by the shadow is never very wide, and the shadow flits along this track at a rate of over a thousand miles an hour.

Actually the sun's diameter is about four hundred times that of the moon, but it is so far, far away that its disk looks to us almost exactly the same size as the moon's. So when the moon slips straight in between us and the sun, and the conditions are right, we do not see the sun at all, but the dark moon-ball surrounded by the glory of the sun's corona, or "crown," as it is called. This marvelous sight never at any place lasts as long as eight minutes, and sometimes is over in a few seconds.

On January 24, 1925, a total eclipse was visible in parts of the northern United States and southern Canada. In New York the day dawned and the sun rose quite as it might on any bright cold morning in midwinter; but a few minutes after eight a bit of shadow appeared on the western edge of the sun-disk. The progress of the dark ball across the bright one was of absorbing interest.

By nine o'clock the curved rim of brightness had narrowed to a slender sickle and the light of day was dimming to a soft gray dusk like that of twilight. Soon strange shadow-bands began to play over the walls of houses and the surface of the snow, rippling rapidly along.

When the light had changed to pearly green and along the west hung lines of dull golden cloud like those of a quiet summer sunset, high overhead stars began to prick through. In the east the sun was almost covered when, as if by a superb miracle, three planets emerged from the depths of space and hung to the right and a little below the wondrous splendor that had been the sun.

All at once the shining sickle gave way to a circle of lovely light, on one side of which flashed for an instant a great jewel of glory. Then the jewel was gone, and the unbroken corona—a ring of lustrous pearl glowing with living brilliance, as if lighted from within by some celestial radiance—was a thing of ineffable beauty.

Another change! Again a jewel flashed out startlingly, directly opposite where the other had shone. A breath's space, then ring of light and radiant jewel slipped into a slim right-curving crescent that was to grow again into the fully rounded orb of the sun's habitual figure.

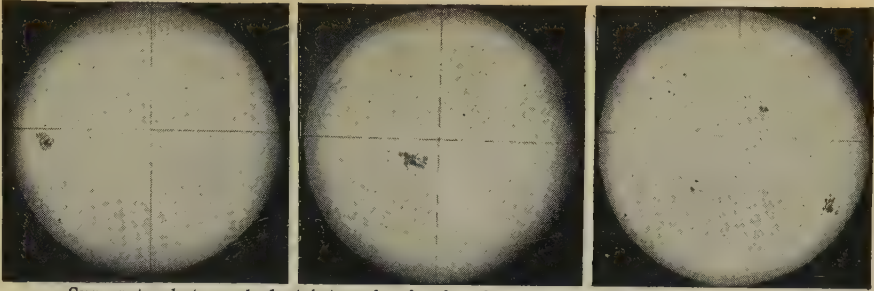
This remarkable picture was taken in Bronx Park, New York, at 9:11 A.M., the moment of totality.

A. Fassbender, photographer; Eclipse Photo Art Company, exclusive distributors.

FLAMES THAT WOULD SHRIVEL UP THE EARTH



The surface of the sun, like that of the earth, is not smooth; the flames fly out in all directions, fiercer than any heat known on the earth, and long enough to shrivel up the earth like a speck as in this picture, which shows how the earth would look in the midst of the sun's flames. The picture is drawn as if the sun were eclipsed by the moon, and we were looking from another world. The surface of the sun is endlessly disturbed by mighty tempests of fire, and many of its flames have been measured ten times as long as the distance across the earth.



Sun-spots photographed at intervals of a few days, showing that the sun revolves.

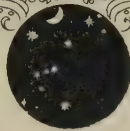
THE SUN AND ITS POWER

WE must, of course, begin our study of the heavenly bodies with the sun. It is by far the most important of them all for us, as it is the source of the earth's life and beauty. This great glowing ball sends forth, day and night, in every direction, enormous streams of light and heat, and has been doing this for countless ages. We know how powerful the sun's heat and light are in so far as the earth catches them; but it is right to remember that all the light and heat that fall on the earth are a mere nothing compared with the total amount the sun is always giving out in all directions.

As we know the size of the earth and its distance from the sun, we can calculate that the amount of the sun's light and heat which fall on the earth is less than one 2,000-millionth of the whole. Yet this trivial fraction of the sun's light and heat makes all the difference between an earth without life and the earth we know. As has been well said, "for the power to live and move, for the plenty with which we are surrounded, for the beauty with which nature is adorned, we are immediately indebted to one body in the countless hosts of space, and that body is the sun."

We can get some idea of the sun's power by remembering that if there were 2,000 million earths dependent for all these benefits on the sun, he would be able to satisfy them all. He

CONTINUED FROM 3040



could give every man, woman and child in the world the same heat as he

gives to the whole earth, and yet have left enough for hundreds of millions more. We know that the earth, compared

with our own small bodies, is large. The distance of a line drawn right through it from one side to the other, passing through its centre, is almost 8,000 miles. This line is called the diameter, which really means the "measure across." But the diameter of the sun is nearly 865,000 miles.

The earth's circumference measures about 25,000 miles, but that is hardly any distance at all compared with the circumference of the sun. It has been calculated that a train traveling sixty miles an hour would have to travel without stopping for more than five years before it went around the sun.

We can get some further idea of the size of the sun when we learn that if it were cut up into a million parts of equal size, each part would be bigger than the earth. They would not, however, be as heavy as the earth, for the sun is much less dense than the earth. The mass of the sun, compared with the mass of the earth, is about three hundred thousand times as great. The earth has shrunk much more than the sun, and the matter in it is more tightly packed. The earth is denser because a great part of its matter has condensed into liquids and solids, while the sun is probably a mass of gas.

The heat of the sun is something almost unthinkable. We know that the degree of heat of most things can be measured by a thermometer. Using an ordinary thermometer, we say that the heat of the body is between 98 and 99 degrees Fahrenheit, which we mark like this: 98° and 99°. If the heat of the air in the shade is as high as that, we can scarcely stand, so hot is it. Boiling water is hotter still, and the flame of a match or a fire is much hotter than boil-

the limits of the truth. The interior must be far hotter. If the earth were raised to that temperature, every living creature would be burned up long before the earth had reached any such temperature. Also in a very short time the whole earth would be turned into gas.

If the temperature of the earth were gradually raised to something like the temperature of the sun, there would come a time when all the compounds would be split up. Very few chemical



THE SUN IN ECLIPSE, SHOWING THE CORONA AND PROMINENCES

ing water. For some purposes—as, for instance, in order to melt metals—we have to produce as high temperatures as we possibly can. By means of electricity, in what is called the electric furnace, we can, with great difficulty and at great cost, produce for a short time a temperature of nearly 10,000 degrees.

All this is much less than the temperature of the sun. It is by no means easy to find out what that really is, and many calculations have been made. But if we think of the temperature of the surface of the sun as somewhere between 10,000 and 15,000 degrees, we shall be within

compounds exist at a very high temperature. All the water of the earth, after having been made into a gas by the heat, would be broken up into the oxygen and hydrogen of which it is made. Sand, and the rocks that are made of burned, or oxidized, silicon, would be split up into their oxygen and silicon. These elements and all the others, including all the metals, would exist in the form of intensely hot and intensely bright gases. Such a picture gives us some idea of what the composition of the sun probably is.

The distance of the sun from the earth changes slightly from day to day,

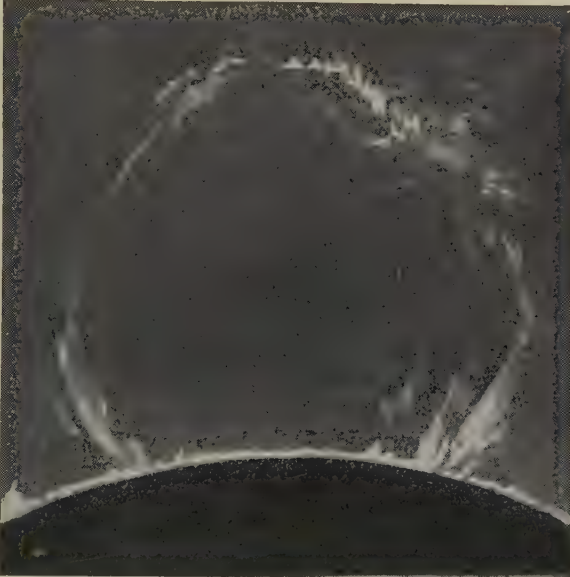
as the earth does not move round the sun in a circle but is a trifle nearer in winter than in summer. The difference is very slight, however, and 93,000,000 miles is the average distance.

Compared with the size of the earth, this distance is very great. But, compared with the distance of the other stars, it is very small. As Sir Robert Ball says, "the fact is that we are nestled up comparatively close to the sun for the benefit of his warmth and light, while we are separated even from the nearest stars by a mighty abyss."

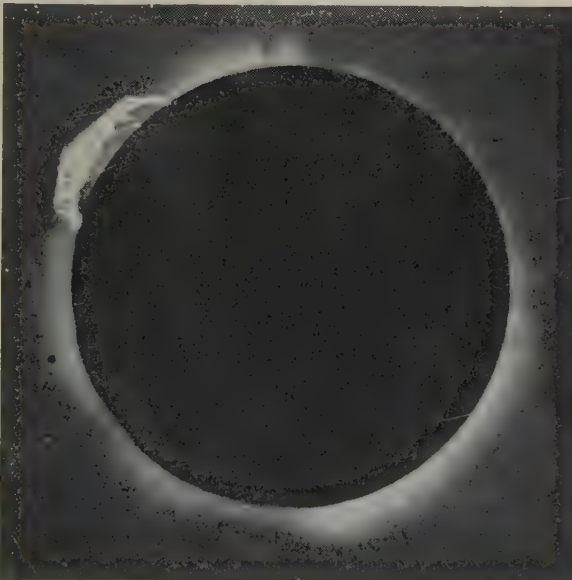
If the sun were to move away from us until at last he were as far off as even the nearest star, the earth would be in perpetual night, and no creature could live on it. If it were possible for a man to live on such an earth, and if the sun at that distance could be seen at all, it would be for him only one of the stars, and by no means one



A prominence on the sun photographed at the Yerkes Observatory in 1910.



An eruption extending to a height of 285,000 miles at the time photograph was taken at the Yerkes Observatory.



A flame bursting out of the sun for tens of thousands of miles, photographed in 1919.

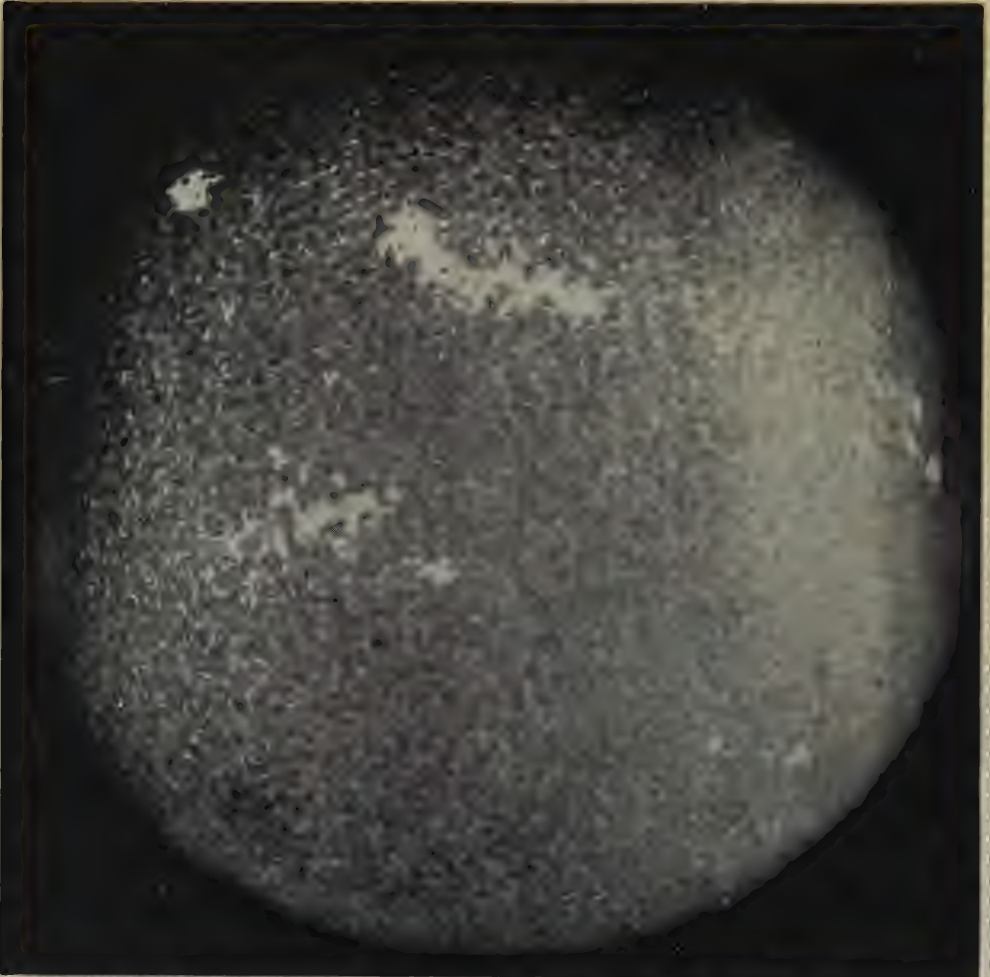
of the brightest. Somebody has said that "if the sun and the earth were to vanish, the effect in the universe would simply be that a tiny star had ceased twinkling."

In the year 1610 Galileo discovered that there were dark spots on the sun, and that these spots moved across the surface from day to day. There was nothing to be found about sun-spots in the writings of Aristotle, and so the people who were powerful in the time of Galileo said that what he called sun-spots were due to faults in his telescope or in his eyes. Worse than this, the discovery was regarded as an insult to the sun, implying that it was not perfect. But since the time of Galileo we have learned to regard sun-spots as among the most interesting things in the sun. When large ones are present, anyone can see them for himself by looking through a smoked glass; for we should

always use a smoked glass when looking at the sun. If we watch them from day to day, we find, as Galileo himself found nearly three hundred years ago, that the spots very often travel right across the face of the sun, disappear, and then appear again on the other side.

We notice also that as they reach the side of the sun they seem to get narrower,

The study of the sun-spots, as they travel across and as they change their apparent shape, helps us to prove how the sun spins. We find a spot traveling across the sun in twelve or thirteen days, and then we may find the same spot appear again on the other side after twelve or thirteen days more. We find that sun-spots always travel in the same



A PHOTOGRAPH OF THE SURFACE OF THE SUN, SHOWING PATCHES OF RARE BRIGHTNESS

This photograph was taken by a special instrument (the spectroheliograph) attached to the great refractor of the Yerkes Observatory.

as if we were looking at them sideways. This can only mean that the sun spins round, and we now know that it takes rather more than twenty-five of our days to do this. That is to say, that while the sun spins round once the earth spins round more than twenty-five times. We are not quite certain, but it may be as many as twenty-seven times.

direction, which is, of course, the direction in which the sun spins. We find also that the sun spins round in the same direction as the earth and all the other planets. The same is true of the direction in which the moon travels round the earth, and the direction in which the moon spins on its axis.

Spots are noticed at various parts on



Here our scientific artist tries to show how the planets were formed in a vast spiral nebula. The spiral is formed by the close approach of one star to another and the continuous ejection of material on opposite sides due to the enormous tidal action of the disturbing star. In the course of time the ejected material will lie along two curves which appear as the arms of a spiral, while in reality the particles are moving around the central star. It is from this ejected material that the planets and satellites are formed.

the surface of the sun, and there are other parts where they are not noticed. We do not often see them close to the equator, or middle line, of the sun, and we never find spots near the poles of the sun. There are certain zones, or belts, of the sun, corresponding pretty well to what we call the temperate zones of our earth, where the spots are found.

Of course this fact means something as to the way in which the different parts of the sun are made, but we have not yet been able to understand it. Occasionally we find a spot close to the sun's equator, and occasionally one not so very far from one or other of its poles. When we compare the rate at which these spots move, we find that those nearest the equator travel completely round the sun in less time than those nearer the poles. If these were spots on a solid body which rotated all in one piece, as a top does, they would all take the same time to move round.

THE MYSTERY OF SUN-SPOTS THAT WOULD COVER THE WHOLE WORLD

The fact that the spots move at different rates can mean only that different parts of the sun's surface go round at different speeds, as is quite possible in the case of a body made of gas. Lately, in careful study of the giant planet Jupiter, it has become almost certain that various parts of its surface move round, as it spins, more or less independently of one another, and this doubtless means, as it does in the case of the sun, that the surface of Jupiter is not solid, but either wholly gaseous or partly gaseous and partly liquid.

What we usually call spots are darker than the rest of the sun. There are many spots also, perhaps more than the dark spots, which are brighter than the rest of the sun. We must think of the surface of the sun as consisting of hot gases reaching to a tremendous depth. These gases are in a state of great commotion, and the spots we see on the sun may depend on the collection of particular kinds of gases at particular places. The dark spots are believed to be whirling uprushes of gas from deeper parts of the sun. We call them spots, but we require a better idea of their size than that word gives us. It is not uncommon to notice a spot into which several earths could be put.

It is very interesting to know that there

is some connection between sun-spots and various things which happen on earth. Changes in the earth's magnetism, and in the movements of magnetic needles on the earth, correspond with changes in the number and size of the dark spots on the sun. When we come to think of it, this is an amazing thing—that these changes in the surface of the sun should be registered by magnetic needles on the earth. Probably it is not right to say that sun-spots cause the disturbances in the way in which the earth—that great magnet—attracts the compass needle. It is more probable that something happens in the sun which causes the spots there. This changes the quality of the various influences which the sun pours on the earth so as to cause these magnetic changes.

THE SUN'S ELEVEN-YEAR PUZZLE THAT SETS THE SCIENTISTS THINKING

There is something even more remarkable about sun-spots, which is that the number and size of them change from year to year in a regular way. There can be no doubt about this, for sun-spots have been carefully watched for three hundred years. Through all this time there has been a regular increase and decrease in the number and size of sun-spots. At the end of eleven years they are just about as numerous and as large as they were at the beginning. Then they repeat their changes for another eleven years, and so on. When a change in anything goes round and round like this in a regular way, we call one round a cycle, and so we say that the sun-spots show an eleven-year cycle. Whatever causes them is something which waxes and wanes at this rate. What it is and why it should do this, we do not know, but it is one of the facts which will some day help us to understand something about what goes on inside the sun.

HOW SIR NORMAN LOCKYER SHOWED MEN A NEW LIGHT ON THE SUN

It happens that the size and distance of the moon are such that now and then it passes between us and the sun. For a few seconds or minutes it sometimes fits almost exactly over the body of the sun, as it were. When this happens, anything projecting from the body of the sun on any side can be seen. Such projections do exist. They are very beautiful in themselves, and they tell us a great deal about the surface of the sun. They

WHAT A SUN-SPOT LOOKS LIKE



A BIG SPOT NEAR THE CENTRE OF THE SUN AS SEEN THROUGH A TELESCOPE

are not bright enough, however, compared with the blaze of sunlight, to be seen as a rule, any more than the stars can be seen in the daytime. Only during a total eclipse of the sun, when the body of the sun is hidden by the moon, can we see these things clearly.

In 1868, however, the famous English astronomer Sir Norman Lockyer made an instrument by which astronomers can see these prominences of the sun even when there is no eclipse. The prominences are great masses of hot gas. They give out light of a different kind from that given out by the body of the sun. Sir Norman Lockyer's instrument enables the astronomer to cut off the ordinary sunlight from his eye so that he can see the prominences by themselves. They are notable for their enormous size and their splendid red color.

THE GIGANTIC FLAMES OF FIRE THAT WOULD CONSUME THE WORLD

We may think of these prominences as gigantic flames, and, like other flames, they flicker, though of course they are so enormous and so far from us that they require to be watched for some hours before we notice their movements. We can sometimes see one of these great red flames starting forth from the surface of the sun and darting outward.

We thus come to see that the surface of the sun is far from being a steady, quiet thing, but is endlessly disturbed by mighty tempests. No storm that travelers ever experienced on the earth can compare with the storms on the sun. We can measure the length of these flames. Many have been measured ten or more times as long as the diameter of the earth, and a good many years ago one was watched which was estimated at more than one-third of a million miles. Some idea of its force as well as its size is given us when we learn that this flame must have dashed out from the sun at 250 miles a second.

The ring of light round the sun is called its corona, from the Latin word *corona*, a crown. The corona of the sun seems to consist mainly of an element to which Sir Norman Lockyer gave the appropriate name of *coronium*. Nearer the body of the sun we find proof of the existence of the gases or vapors of many elements we know well, which can be found in our own bodies—hydrogen, calcium, magnesium, sodium,

iron, and a large number of other metals well known to us.

THE GRADUAL COOLING OF THE SUN THAT IS ALWAYS GOING ON

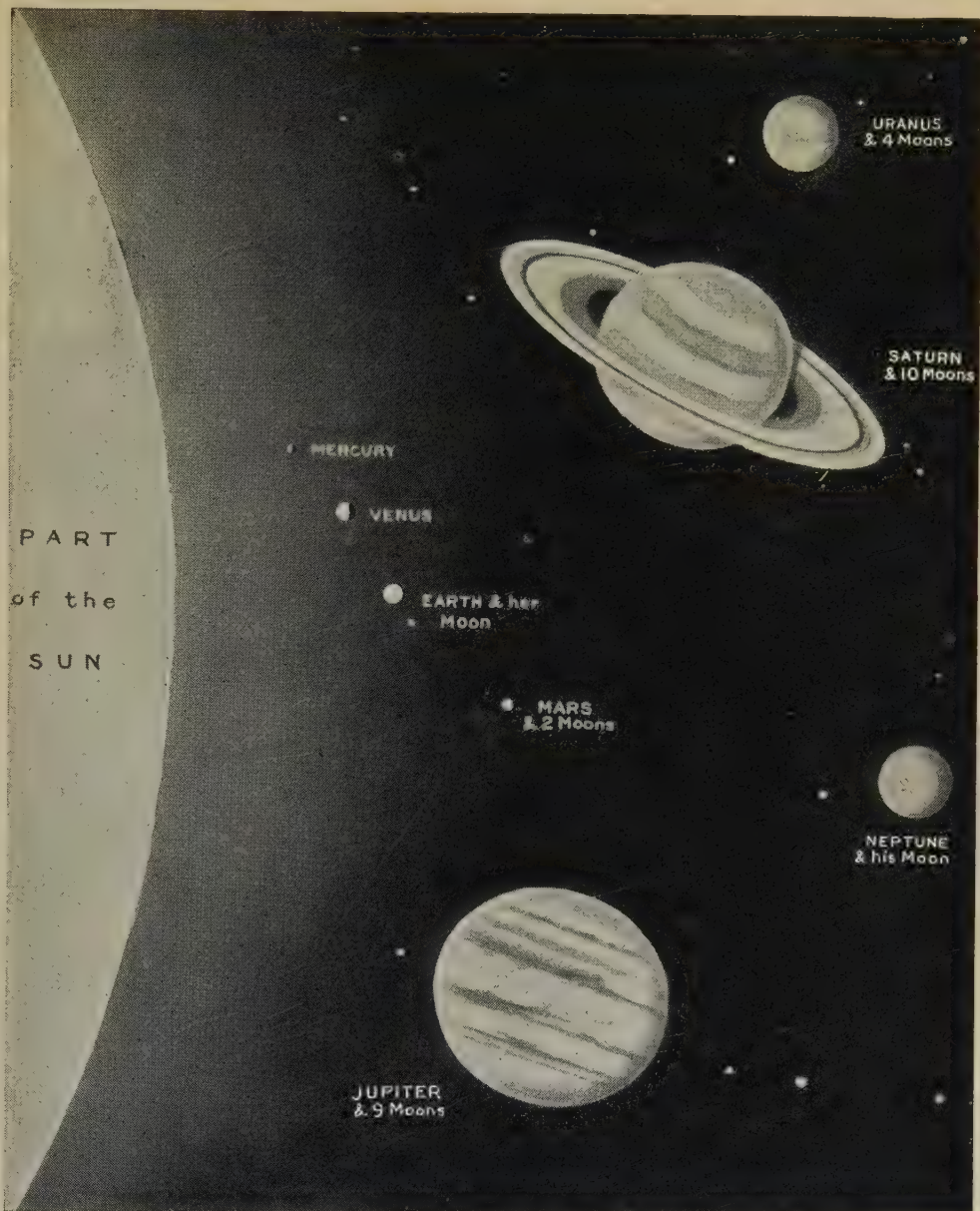
It is important to compare the sun with other stars. We now know that all stars, including the sun, have a history; that they cannot remain bright forever, but must gradually cool. The chemical composition of their outer parts changes as they cool, and so the quality of their light changes. We believe, then, that the sun is somewhere in the middle stage of a star's history. At its hottest and most brilliant stage a star gives out a very white light. Such a star is Sirius, the brightest star in the heavens. Astronomers believe that changes occur later in a white-hot star. The star gets somewhat cooler, and becomes yellow-hot, like the sun; and we can see other stars in the heavens which we may call red-hot. The chemical composition of these, judged by their light, is different from that of the sun.

We know enough to allow us to say that the sun and the planets and their moons are really parts of one great whole. We know that all these parts are slowly losing heat and shrinking. We can learn from the study of the stars and the nebulae in many parts of the heavens something of what the history of the sun must have been. We can guess the probable future of the sun from what we know of the redder stars, from the little we know of the dark stars that cannot be seen, and from the study of our own earth, which was once a little sun but has cooled down very quickly.

THE MARVEL OF THE SUN'S POWER IN ALL OUR DAILY LIVES

Meanwhile we know that it is what it has been since life first appeared on earth, and what it must continue to be so long as life remains on earth. It is the great source of the power which sustains all life. It makes the rain and the rivers, gives every visible part of the earth its light and color and beauty, supplies the food of the green plants on which we feed, and so works in our muscles every time we move. It is in the eyes which see the beauty of the earth and of the sun itself, and in the brains by means of which we try to learn how all these things come to be.

It is not without reason that the sun and the eight planets which circle about it are spoken of as a family. They move



Earth and its neighbors in the solar system—the worlds that spin around the sun.

The planets and their moons are all drawn to scale, showing their sizes compared with one another.

in the same way, and the same law governs their movements; they are made, as far as we can ascertain, of the same materials; they are, allowing for differences of age and size, very much like one another in appearance; and everything new learned about them confirms the belief that they influence one another.

We know that every substance which has been found on the earth or in the sun

or on any planet can exist as a gas. We know also that every gas at some temperature will become a liquid and at another temperature will become a solid.

So it is possible that in the beginning this mass of gas was far more widespread than the whole space now taken up by the sun and all its planets. Perhaps it was moving through the skies as they do, though probably more slowly, and obe-

dient to the mysterious law which rules their awe-inspiring motion and that of all the stars. When and why and how the great mass of gas began to spin, as the sun and the earth and all the planets spin, cannot be determined.

A GREAT AND MYSTERIOUS FACT THAT MAN WOULD LIKE TO KNOW

Some men have supposed that in its never ending journey through space it encountered some other starry traveler, and that the two, by their partial collision, set one another spinning. Or, again, perhaps the mere falling-inward of the particles of gas, under the same law of gravity which makes a stone fall to the ground, set the whole irregular mass spinning.

Now, if this is what happened, the rest of the history of the sun and its family is not hard to follow. The particles fell inward and they fell together. Those falling inward fed the sun if they fell far enough; but many clashed against one another and clung. As they swept round the sun for millions on millions of years they collected into themselves other particles, till at last they became larger and larger. Anyone who has ever rolled a hoop knows that if the hoop is rolling along fast and straight enough it seems as if it could go on forever, but that sometimes it wobbles and very soon falls to the ground.

So with the particles that flew round the sun. Some went round it at such a pace and in such a way that there was no reason why they should not go on continually. They did that, and have done it ever since, collecting and adding to themselves any stray objects in their path. These were the clots or knots of particles which grew into planets, and their orbits or paths are those which are said to be stable—that is to say, they are not to be altered or badly upset by the pull of the great sun, or by the pull of other planets that swing steadily round in other orbits.

HOW THE LENGTH OF THE YEAR VARIES ON OTHER WORLDS

Such are the great planets, and something of their way of sweeping-up can still be recognized in the big moons that circle round them, or in the rings of tiny moons round Saturn. These big planets are eight in number, some bigger than the earth, but none more solid, for some are much lighter and have not cooled down to the same degree as the earth.

These are the chief facts about them:

<i>Planets</i>	<i>Miles from Sun</i>	<i>Length of Year</i>
Mercury	35,000,000	88 days
Venus	66,000,000	224 days
Earth	93,000,000	365 $\frac{1}{4}$ days
Mars	140,000,000	686 days
Jupiter	483,000,000	12 years
Saturn	870,000,000	29 $\frac{1}{2}$ years
Uranus	1,754,000,000	83 years
Neptune	2,750,000,000	165 years

Two of these planets have no moons; others have from one to ten: Earth, 1; Neptune, 1; Mars, 2; Uranus, 4; Jupiter, 9; Saturn, 10.

THE EIGHT BIG PLANETS AND THE HUNDREDS OF LITTLE PLANETS

Long ago a great astronomer, Sir John Herschel, told how to make a model which would give an idea of the great mass out of which the sun and its family formed themselves, and of the distances from one another at which the planets gathered themselves together.

In a great field we may put in the middle an electric light globe two feet across, to represent the sun. At 82 feet from it we put a mustard seed for Mercury. Venus, 142 feet away, will be as large as a pea, and that also will be the size of the earth, 215 feet away from the arc-light. Mars will be smaller, a peppercorn, 327 feet away. Jupiter will be a small orange nearly a quarter of a mile off. A tangerine for Saturn is two-fifths of a mile away, and Neptune, the farthest of all, will be a mile and a quarter off, and the size of a plum.

But that list does not include the little pieces of territory which are called planetoids, of which about a thousand are known. They seem to circle in a fixed orbit between Mars and Jupiter. In the model we have made they would be no larger than grains of finest sand. They do not fall into the sun, but there are uncounted millions of smaller pieces which drift into the sun every day.

As the years pass by, the number of skilled observers increases. The growing power of the instruments they use enables men to extend their knowledge of the solar system, of which the earth, in size, is an inconsiderable part. In spite of this the sense of mystery remains, and we can still say with Tennyson:

Let knowledge grow from more to more,
But more of reverence in us dwell.

THE NEXT STORY OF THE EARTH IS ON PAGE 3289.

THE SUN'S MIGHTY CROWN OF LIGHT



This picture gives us some idea of the shape and splendor of the great ring of light round the sun, though no picture can give any real idea of its magnificent beauty. The pity is that only for a few seconds, once in many years, when the moon hides the body of the sun from our view, have we any chance of seeing this mighty crown of light; but of course it is always there. The part of it that is nearest to the sun is intensely bright, but it gives out a paler light than the red prominences which can still be seen blazing through it at various points.

The Book of All Countries



A busy scene on a river bank in British Honduras.

THE OUTPOSTS OF EMPIRE

WE have glanced at the various parts of the British Isles, the great Commonwealths and Dominions beyond the seas, and the many lands that fly the British flag in the vast continent of Africa. Yet still there remain more than thirty possessions under British rule that we have not mentioned. They are distributed among all the continents, and added together they make an empire of their own, ten times as large as England and Wales, with a population of fifteen million people.

They may be grouped into six divisions: the West Indies and their British neighbors; the East Indies under British protection; the lands committed to Britain's charge by the League of Nations after the World War—known as the Mandatory Lands, because she rules them under mandate from the League; the States protected or ruled in Farther India; the Pacific Islands that are not under the rule of the Australian Commonwealth and New Zealand; and, besides all these, a dozen scattered possessions which are outposts of the Empire, partly needed for its protection, or as links in its lines of communication.

None of the other great empires of the past has possessed anything like the number and variety of these small outposts of Britain. An island nation living by her ships needed re-

CONTINUED FROM 3058



fitting and coaling stations, and little by little secured them in all parts of the globe.

We must make a voyage round the world and call at these stages on the path of Empire, and we must also look on our way at other lands under the flag.

And first, traveling toward the East, by way of the Mediterranean, we arrive at the rock fortress of Gibraltar, the European window from which Britain looks out to Africa. The famous rock commands the entrance to the Mediterranean at a point where the distance across to Africa is fourteen miles. The commander of the garrison is the governor of the town, which has a civilian population of just over 17,000.

Gibraltar was captured from Spain in 1704 by Admiral Rooke, and ceded to England in 1713. For three years and seven months (1779 to 1783) it withstood a siege by the French and Spaniards, and proved untakable. Now it is a fine naval base, with a safe harbor, and docks for refitting ships. The area of the fortress and town is about two square miles, and its height is nearly 1,400 feet.

The stern and rugged rock of Gibraltar, inside which are chambers packed with secret stores and defensive material, rises like a lion in the path of the enemies of Britain. It is the first one of the outposts with which

she has protected the road to her far-off lands.

Sailing again for 1,200 miles, we reach Malta, the island in the Mediterranean Sea, about 60 miles south of Sicily, where Paul was shipwrecked, as described in the Acts. The ancient trading nations used it and have left their images, pottery and tombs to mark their presence. Malta was captured from the French in 1800, and ceded to Britain in 1814. With it are other islands, Gozo and Comino being the largest. The total area of all is 120 square miles.

Malta has had a stirring history. It was taken by the Moors, recaptured, and given to the Knights of St. John to defend, and was gallantly held by them against the Turks, when that warlike race was threatening to overrun Europe. These knights did much for the island, making fine fortifications and bringing shiploads of earth from Sicily, the better to grow food on this sun-smitten rocky island. The capital, Valletta, is named after La Valette, the Grand Master of the knights who repelled the Turks. Napoleon captured the island when he was on his way to Egypt before the Battle of the Nile, and Britain recaptured it from him.

It is now a naval centre, with an arsenal and dockyard. The Maltese, who preserve their ancient language derived from Arabic, also speak English and Italian. They have self-government through their own legislature, and rank as British citizens. The population numbers well over 200,000. From the island we get early potatoes, onions, oranges, grapes and melons. Cotton also is grown. The Maltese are clever filigree workers, and the women make fine lace. Malta is a twin stronghold with Gibraltar.

Now we must make another step to reach the third stepping-stone, Cyprus, an island notable in ancient history. It was rented by the British from the Turks when war with Russia was threatened and Britain was supporting the Turks, and it was annexed by Britain when the Turks joined the Germans against the Allies in the World War. Its size is 3,600 square miles, and its population over 300,000, of whom about a fifth are Mohammedans. Nicosia, with about 20,000 people, is the capital. It is an agricultural island, growing grapes, raisins, olives, oranges and lemons for exportation. It

also exports cotton, copper, asbestos and sponges.

SENTINELS IN THE INDIAN OCEAN

Passing through the international Suez Canal, which is chiefly owned by Britain, and through the Red Sea, we come to the Indian Ocean, and to the fortress and coaling station of Aden, on the stony coast of southern Arabia. With it are grouped the islands of Perim (five square miles), and Socotra (1,382 square miles, and 12,000 people), and the Kuria Muria Islands. Aden itself has an area of 75 square miles, and behind it is a protectorate of 9,000 square miles, over which British influence extends. The population is nearly 60,000. Aden is a hot and almost waterless place, important only because of its position and its use as a storehouse of goods for lands around. It exports coffee, gum and dates.

Southward from Socotra, in the Indian Ocean toward Madagascar, lies a group of many islands known as the Seychelles, the principal one being Mahé, on which is the capital and coaling station, Victoria. They have an area of 156 square miles and a population of about 25,000.

The islands are very healthy. Formerly they belonged to France, but were captured by the British. They were made a colony in 1814. For over seventy years they were administered from Mauritius, but in 1888 were given their own government. Coconut products are the chief wealth. Guano and oil of cinnamon are also exported. On one of the islands the gigantic land tortoise is found. The islands have been used for the deportation of rebellious chiefs exiled from tropical lands under British rule.

About twenty degrees to the south of the Equator and 500 miles to the eastward of Madagascar is Mauritius, famous for its growth of sugar. The exported crop has sometimes exceeded \$50,000,000 in value.

Mauritius was discovered by the Portuguese early in the sixteenth century, and was occupied by the Dutch in the seventeenth century, but abandoned by them later. The French then made it their headquarters in the East for over seventy years, and called it Isle de France. In 1810 it was captured by the British, and was retained by them after the defeat of Napoleon. The British gave it back its Dutch name of Mauritius, in honor of a

PEEPS AT THE EMPIRE OVERSEAS



An impressive Hindu temple in Penang.



A chief's house in Tonga.



The Mohammedan Mosque at Singapore.



Napoleon's burial-place on St. Helena.



Pillars of the Temple of Anuradhapura, Ceylon.



The Cathedral, Port of Spain, Trinidad.

Dutch prince named Maurice. French, however, is still spoken in the island.

The area of the colony is about 720 square miles, and the population is nearly 400,000, two-thirds being Indians. Port Louis, with about 40,000 people, is the capital of Mauritius.

Several islands and island groups in the Indian Ocean are dependencies of Mauritius, the chief being Rodrigues with 6,500 inhabitants, and Diego Garcia, a coaling station for ships to Australia.

In the summer of 1923 Mauritius and Rodrigues came sensationally into public notice owing to the arrival at each island of a boat with survivors from the foundered steamer *Trevesa*, after more than three weeks' lonely sailing, athirst and hungered, through storms, under the burning sun of the Indian Ocean.

Crossing the Indian Ocean from Aden to Ceylon, we pass the Laccadive Islands, associated with the Madras Presidency, and we leave farther to the south the Maldivé Islands, which are under native rulers and pay tribute to Ceylon.

THE BRITISH DOMINIONS OF CEYLON AND FARTHER INDIA

Viewed from the sea, this "utmost Indian Isle," as the old geographers called Ceylon, is a most beautiful sight. "Adam's Peak," the great hilly range of the centre, towers like a monarch amidst its encircling range of hills. The low coast-line is almost lost to sight under the green groves of palms. From the Portuguese Ceylon passed to the Dutch and from them to the British in 1796. In 1802 it was made a crown colony. With an area of over 25,000 square miles and a population of four and a half millions, it may well be rated as one of the greater British possessions.

Its capital Colombo is one of the world's great ports of call. It has a population of about 250,000, and the tonnage of shipping entering Ceylon harbors amounts to 13,000,000 a year.

Ceylon is chiefly agricultural, cultivating coconut-palm, rice, tea and rubber. Its chief mineral product is plumbago. It has valuable pearl fisheries. Cinnamon is the spice that ladens its breezes.

The people of Ceylon are chiefly Cingalese in the centre and south, and Tamils from southern India in the north.

Buddhism is the religion most widely held. About a tenth of the whole people have adopted Christianity.

The Cingalese are skilled workers in gold, silver, ivory and tortoiseshell, and are expert in pottery. In the interior is a remnant, between four and five thousand, of a primitive race called the Veddahs.

Leaving the penal settlement known as Andaman Island (27,000, nearly half convicts) to the north in the Bay of Bengal, we pass the Nicobar Islands on our way to the flourishing State of Farther India, the Straits Settlements and Malaya.

The importance to the British Empire of the peninsula of Malaya is not realized by many, owing to the rapidity of the progress that has been made. First, bordering the Straits of Malacca, are the Straits Settlements, under direct British authority. They include Penang Island, earliest of the peninsula possessions, dating back to 1786; Province Wellesley on the mainland; the Dindings Territory and Malacca, leading on to the great island port of Singapore, the centre of government. Singapore extends its rule to Labuan, an island off the coast of Borneo, and to smaller islands in the Indian Ocean. These settlements have a total area of 1,600 square miles and a population of 900,000, of whom 400,000 are in the town of Singapore, the greatest port and trading centre of the Farther East.

But, besides these Settlements, four of the Malay States are federated, or joined together, and five are included separately under British protection. The Federated States of Malay have a population of about 1,350,000, and the other States have about 1,120,000. Thus the Malay Peninsula has nearly two and a half million people in association with the Empire, and their progress has been rapid. The various States are linked up by over 1,000 miles of railways and 2,500 miles of good roads.

The people of Malaya are Malays, Chinese and Indians, with about 6,000 Europeans.

The great increase in trade in comparatively recent times has come from the cultivation of rubber and the mining of tin; but there is a large business in coconut products, spices, sago, tapioca, and preserved pineapples, timber, gutta-percha and malacca canes.

The chief towns are Singapore; Georgetown, the capital and port of Penang; and Kuala Lumpur (80,000) in the Federated State of Selangor.

INTO THE FAR CORNERS OF THE EARTH



The gorgeous Hindu temple at Colombo, capital of Ceylon.



The peak overlooking the harbor at Hong-Kong.



A group of Solomon Islanders in the shade of the palms.



*The first Englishman, Barbados.



A street of steps in Malta.



A Ceylon plantation.

*© Underwood & Underwood, New York.

Northward from Singapore we pass the large East Indian island of Borneo, of which about 77,000 square miles, with about 900,000 people, is under the British flag in the three States: North Borneo (under a chartered company), Brunei (under a native ruler with a British resident), and Sarawak, which has been admirably governed since 1842 by a remarkable British family named Brooke. Kuching, with 30,000 people, is the capital of Sarawak; Brunei, with 10,000, is the capital of Brunei; and Sandakan and Jesselton are the largest towns in the mountainous region of North Borneo.

The products of the Borneo States are those of the East Indies generally—rubber, sago, spices and guttapercha. Oil has been increasingly procured in Sarawak, and coal exists there, as well as in Brunei.

The occupation of Sarawak by the British is an interesting story in the growth of the British Empire. Sir James Brooke, the founder of the State, began active life as a soldier in India. He was severely wounded in Assam and invalided home. On his return the voyage out was so long that his time of leave expired, and he resigned, but he continued on the ship, which visited many East Indian islands. This voyage suggested his life's plan.

He returned to Borneo from England and fascinated the natives by his feats in horsemanship and shooting; and presently he was appointed, by their ruler in Borneo, Rajah of Sarawak. This was in 1841. He quickly righted abuses and won the full confidence of the natives. Then he suppressed piracy and head-hunting after hard fighting. For all this he was attacked by busybodies in England, but, returning home, he defended himself completely, and won the reputation of a man of stainless honor. Later, when there was a rebellion by the Chinese in Sarawak, the Malays stood by him loyally.

Finally, Sir James Brooke went home and died in Devonshire; Sarawak was made an independent State associated with the Empire; and ever since it has been governed with continuous success by relatives of its founder, who have carried out his schemes in his spirit.

A GREAT TRADING CENTRE IN CHINA

The island of Hong-Kong at the mouth of the Canton River was ceded to Britain in 1841, to be a centre of British trade

outside the mainland. Since foreigners have been more readily tolerated, an area on the mainland itself has been added. The island itself has an area of 32 square miles. The whole area under British government covers 391 square miles, with a population of over 600,000, of whom nearly 13,000 are not Chinese.

From the sea the general view of Hong-Kong is one of singular beauty. Inland the prospect is wild, dreary and monotonous. The hills are bare of trees, the streams bordered by rank brushwood. Nowhere do cultivated areas or fertility relieve the eye.

The city part, called Victoria, is a most flourishing trading community, adjoining a free port extensively used, and including naval and military defenses. Large quantities of British manufactured goods, including cottons, woolen goods, iron, steel, machinery and electrical goods, are distributed through Hong-Kong as a depot. Sugar and tin are refined there, and the Chinese tea and silk produce reaches the world through this port. The building and refitting of ships is carried on. The fisheries are important, and there is an abundant storage of coal.

In northern China, when the Germans occupied Kiaochow, the British leased the bay of Wei-hai-wei in Shantung, with the land ten miles inland around the bay, but presently, in accordance with the Treaty of Washington, the district will return to China.

The area occupied is nearly 300 square miles, and the population is about 160,000. The territory has been held as a naval base and sanatorium, as the climate is healthy and invigorating.

B BRITISH POSSESSIONS IN THE PACIFIC

Returning from Wei-hai-wei and traveling toward Cape Horn across the great Pacific, we find twenty groups of islands, after the Japanese and American zones of the ocean are left. Each group is under either British, Australian or New Zealand administration, except that some groups are ruled jointly by more than one State.

We give the principal groups (see if you can find them on the map) and approximate populations: Gilbert Island (British) 30,000; Bismarck Archipelago (Australia) 190,000; Solomon Islands (British and Australia) 150,000; Papua (Australia) 300,000; New Hebrides (British and French jointly) 60,000; El-

IN MEDITERRANEAN AND CARIBBEAN



The famous Rock of Gibraltar standing like a sentinel at the entrance to the Mediterranean.



Natives of Jamaica at rest outside their hut.

lice Islands (British) 3,500; Fiji (British) 160,000; Nauru (British and New Zealand) 2,500; Union (British) 1,000; Tonga or Friendly Islands (British) 24,000; Cook Islands (New Zealand) 13,000; Samoa (New Zealand and America) 38,000; Chatham Island (New Zealand) 450. The total population of the British Pacific Islands is over a million.

The people of the Fiji Islands, of which Suva is the capital, are now converted to Christianity. Sugar and coconut products are the chief exports. The Tongans also are Christians. Coconut is the chief export. Ocean Island, the headquarters of the Gilbert and Ellice Colony, produces phosphates, as also do several islands in the group, and Nauru. The chief islands of the Bismarck Archipelago have been renamed New Britain and New Ireland. Coconut-growing is the chief industry. The Samoan Islands produce coconut, cocoa, rubber and sugar. Here rests the body of Robert Louis Stevenson, novelist, poet and essayist, giving a sense of sacredness to the place for all who have felt the spell of his writings.

THE CHARM OF THE SOUTH SEA ISLANDS

The best-known and most frequently mentioned islands of the Pacific are the Fiji group and Samoa groups. These islanders have been able to absorb a great deal of civilization without suffering from undue pride. They were in many respects artistic in their tastes when they were first discovered, as they showed by the elaborate ornamentation of their weapons—one of the first signs of artistic taste found among primitive peoples.

When the teaching of the white men had won them from the warlike feuds which had thinned their population in the past, they became a gentle and courteous people in their ordinary dealings. Robert Louis Stevenson was not alone in finding their gentle grace in ordinary life a fit accompaniment for the mild airs and delightful ease of the Pacific region. He lived among them and loved them, and he sleeps high up on one of their hills.

The South Sea Islands are the real Lotus-land of ancient romance. Life there ceases to be strenuous. Yet these people's forefathers ventured across trackless oceans of vast extent until nearly all the multitude of islands are inhabited. And they retain enough energy to begin

to make a modest place for themselves side by side with white men whenever they attain a fair share of education.

One of the islands that attracted attention when the peace terms were made, after the war, was Nauru, which gained for itself a special clause in the agreement. It is a small island, not far from the Equator, immensely rich in manures. German before the war, it is now placed under the joint rule of Australia, New Zealand and Great Britain, being part of the territory governed under the League of Nations; we may call it the League of Nations' Baby. Here the Germans had their wireless station, and the wireless use of the island is continued. The island was swiftly captured by the Australian navy in the war. There are over 2,000 inhabitants, largely engaged in sending the deposits of phosphates to enrich the poor soils of the older nations.

Passing by the whaling settlement of South Georgia, where lies Sir Ernest Shackleton, the fearless Antarctic explorer, we come to the Falkland Islands, in the South Atlantic, off the coast of Patagonia. The islands have an area, with South Georgia, of over 7,000 square miles, and a population of well over 2,000; Stanley, the capital, having 900 inhabitants. Whaling and sheep-farming are the industries. Off these islands was fought the naval battle in the World War when the German war fleet outside German waters was destroyed by Admiral Sturdee.

ISLAND OUTPOSTS OF THE SOUTH ATLANTIC

In the South Atlantic, nearer Africa than South America, rise the volcanically formed islands of St. Helena and Ascension. St. Helena was occupied by the British as long ago as 1673. It has an area of 47 square miles, and a population of not quite 4,000. Its chief value is as a coaling station. Between 20 and 30 ships call there every year. Flax is one of the crops most largely grown, and tow is the chief export.

The island will ever be famous as the place of the imprisonment of the fallen Napoleon, after the battle of Waterloo. He spent there a miserable life to the end of his days, died there in 1821, was buried there in a coffin made from an Englishman's mahogany table, and was afterward removed to Paris for burial with high honor under the gilded dome of Les Invalides.

Ascension Island, 34 square miles in

COLORED PEOPLE, EAST AND WEST



© B. L. Singletary

When Columbus landed in what he called the West Indies, the people he found there were the Caribs, but these people have nearly all died out now. The West Indies to-day are largely peopled by descendants of the African negroes who were taken there as slaves. The ancestors of this family were, no doubt, slaves.



Further India is made up of what was once the Burmese Empire and part of the Malay Peninsula. The people, like millions of other Asiatics, live chiefly on rice, which they prepare by threshing the stalks.

area, and 700 miles from St. Helena, was occupied by Britain in 1815, when Napoleon was sent to St. Helena. Now it is used as a health resort for crews of ships serving on the African coast. It is a favorite breeding ground of sea turtle. Georgetown, the settlement on the island, was formerly a garrison station.

Tristan da Cunha, a group of islands farther to the south, with about 130 inhabitants, is one of the loneliest spots in the world. Communications with it are generally either by way of the Cape or by whalers passing toward Antarctic waters. The people of the island are very simple folk, who look forward to the gifts sent to them from England when ships go out with the mails. English clergymen have at times spent a few years among them, but the island has little of interest, and life is dull and monotonous.

Returning once more to the west, on the northeastern shoulder of the South American continent, we come to British Guiana, a territory of 90,000 square miles, with a population of about 300,000, more than one-third of whom are Asiatic Indians. Guiana was one of the Dutch foreign possessions before the Napoleonic wars, but when Holland joined with France the British captured it. Its chief product is sugar, to which one of its rivers, Demerara, gives a name. Rum is also exported, and rice. There is a considerable trade in diamonds, and some gold. Much of the work of the colony is done by East Indian coolies. Inland are about 10,000 of the aboriginal Indian tribes. The capital is Georgetown.

In Central America, facing the Caribbean Sea, is British Honduras, a region settled long ago, from Jamaica. It was made a colony in 1884, having before been regarded as an annex to Jamaica. The area is about 8,600 square miles, and the population about 50,000, of whom more than one-fourth are in the capital, Belize. Mahogany is the special product of British Honduras. Bananas and coconuts are much grown there.

THE ISLANDS COLUMBUS MISTOOK FOR INDIA AND CALLED THE WEST INDIES

Look well at the great semicircle of islands that stretch from Florida in North America to the mouths of the Orinoco River in South America. They are the highest part of a mountain chain whose lowest slopes are at the bottom of the deep, deep sea. Some of the islands

are made by little builders without hands who have formed coral barriers and reefs and fairylike islands, very little raised above the surface of the crystal-clear sea. It was on one of these coral islands, San Salvador, in the group called the Bahamas, that Columbus is supposed to have first landed. He was looking for a way to India and so he called all the native tribes of this new world "Indians." Really they were the Caribs and Arawaks, the former a fierce and warlike race and the latter gentle and peaceable. The whole of the sea which is girdled by these islands is now called the Caribbean Sea, and the islands are spoken of together as the West Indies. France and Britain own most of them.

The first of the British West Indies, as they are approached from South America, is Trinidad, which is linked with Tobago for purposes of government. Unitedly they cover 1,976 square miles and have a population approaching 380,000. About one-third are East Indians, and most of the rest are the descendants of negroes who once were slaves. The chief exports are cocoa, sugar, oil and asphalt, which is gathered from Trinidad's great lake.

The capital, Port of Spain, has over 60,000 people. Trinidad is an island of fine scenery, and has a fertile soil. It has come into notice in recent years through the development of its oil-fields.

North of Trinidad the line of the West Indian islands which bound the Caribbean Sea is continued by the Windward Islands, Grenada, St. Vincent and St. Lucia. Grenada's chief products for the outside world are cocoa and spices, particularly nutmeg. St. Vincent has Kingstown as its capital. It has suffered greatly from earthquakes. Its special products are very fine qualities of cotton and arrowroot. St. Lucia, with 233 square miles, has a population of over 50,000 people. Sugar and cocoa are its chief exports.

Eastward of the Windward Islands and farther to the east than any of the West Indian islands is the proud island of Barbados, about as large as the Isle of Wight, and with a population of 156,000. Its first English settlers arrived in 1625, and the island has been a British possession ever since. Its mainstay has been sugar, with cotton as a secondary but declining crop; but oil is now a rising hope. The island has a considerable fish-

ing industry. The capital is Bridgetown. Barbados has its own parliament. The island has a healthy climate, and is to some extent a holiday resort.

North of the Windward Islands is the Leeward group, which includes Antigua producing sugar, cotton and pineapples; Montserrat producing cotton, sugar and lime-juice; St. Kitts and Nevis with sugar, cotton and coconuts; the Virgin Islands growing cotton; Dominica growing limes and coconuts. The population of these islands is partly Negro and partly Carib, and it is decreasing by emigration.

THE LARGEST ISLAND OF THE BRITISH WEST INDIES AND THE BAHAMAS

Jamaica, with nearly 4,500 square miles including neighboring islands, is by far the most important of the British West Indian colonies. It was taken from the Spaniards in 1655. It was the principal West Indian destination for slave labor in the eighteenth century, and three-fourths of its people are black. The whites number about 15,000.

Formerly Jamaica lived chiefly on the growth of sugar and the manufacture of rum. To these are added coffee, coconuts and cocoa; but in recent years the growth of the banana has surpassed in value all other products. The growth of the banana, and its use for food in temperate climates, has revived the business life of Jamaica which was languishing because European beet-sugar was taking the place of Jamaica cane-sugar.

Jamaica is one of the most luxuriant and beautiful islands in the world. In the tongue of the natives the name means the "land of wood and water." It once had a rather alarming reputation for unhealthiness in its low-lying regions, on the coasts and among inland swamps; but science and care have drawn the worst stings from these dangers. When the weather is too hot and damp round the coast all the white people who can do so go up to the beautiful country in the Blue Hills, where the air is fresh and the woods cool and shady. Earthquakes and violent storms are occasional drawbacks, but the island has many compensations in its natural beauty and fertility. The mildness of the climate, even in its hilly parts, tends to relax the energies of its people.

Northward of Cuba, and scattered between the Republic of San Domingo and the peninsula of Florida, are many islands,

twenty of them inhabited, with an area of 4,400 square miles, and a population of over 50,000. These are the Bahamas. Sponge-fishing is their chief business. Tomatoes and pineapples are largely grown, and sisal grass for making hemp is important. Turtles are numerous, and pearls and ambergris are obtained. Nassau, on the island of New Providence, is the capital. The Bahamas were occupied by English pioneers in 1629.

The Bermudas are a group of islands about 600 miles from the coast of the United States and 800 miles north of the West Indies. Really they are in the open Atlantic, and as they have a fine climate and pleasant scenery with luxuriant vegetation, they are much visited by holiday-makers, chiefly Americans. Their area is about 19 square miles, and their population about 20,000. Originally they were colonized in 1609 by a party of English emigrants shipwrecked on their way to Virginia.

Bermuda is an important naval base and dockyard. The chief town is Hamilton, with two or three thousand people.

Their chief products are of the market gardening kind—potatoes, onions and other vegetables, with flowers for table decorations, particularly the beautiful Bermuda lily. A large part of the trade is with New York.

The fate of the West Indies, broadly considered, has not been happy, though the islands are a paradise under favorable conditions. They were the earliest British colonies, and large fortunes were made out of their sugar, grown by slave labor. Other countries have started growing sugar and this has made their prospects doubtful, and at times very dark. Still, the soil is very fertile, and the natives who prefer to live in ease ought to be able to make their lands attractive to visitors and profitable to themselves.

Besides the nations, colonies and protectorates that have been included in the British Empire, there are two protectorates Great Britain is responsible for to the League of Nations, though without recognizable advantage to herself. They are Palestine and Mesopotamia. In these cases Britain has lent the world her services in organizing new nations, rather than absorbing old lands of historic renown into her Empire; but both these countries are treated in Arab-Asia.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 3295.

THE FIRST TELLING OF ALICE IN WONDERLAND



"Lewis Carroll" became famous chiefly because he had three little friends who were always asking him to "tell a story." One was named Alice. One day, when he was having a picnic with his little friends, he made up a story of strange happenings in Wonderland. That was the beginning of Alice in Wonderland, which, when he wrote it down and published it, made his name known forever.

The Book of MEN AND WOMEN



Charles Kingsley.



Sir J. M. Barrie.



Jacob Grimm.



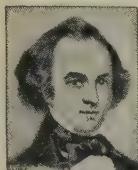
Wilhelm Grimm.



Hans Andersen.



George Macdonald.



Hawthorne.



Lewis Carroll.



Madame d'Aulnoy.



Charles Perrault.



J. C. Harris.



Carl Ewald.

WRITERS OF THE FAIRY BOOKS

IN Venice, that marvelous city of Italy which is itself a fairy story, there lived in the early years of the sixteenth century a man named Giovanni Francesco Straparola.

We know very little about this Straparola, except that he was a writer of stories. In those days Venice was the wonder of the world, and all sorts of clever men were drawn to the town because of its riches, and the splendid company to be found there.

Straparola was a clever Italian who had gone there doubtless because it was a famous place for printing books; and there, for many years, in some unknown house by the side of some old canal, this man with the strange-sounding name wrote his stories, and got them printed in that lovely city of the sea.

All the stories that he wrote cannot be called fairy tales; but, as he drew very largely from folklore, most of them are pure fairy stories. It was a later writer who wrote the story of Puss in Boots, yet Straparola had told the tale before him, though his Puss wore no boots.

Toward the end of the seventeenth century and in the early years of the eighteenth, "the pleasant land of France" was noted for its writers of fairy tales. It was then that Blue Beard, Little Red Riding Hood, The

CONTINUED FROM 3098



Sleeping Beauty, Mother Goose, Beauty and the Beast and many another of our old favorites first took the form in which we know them to-day. The two great writers of fairy stories at that

time were a Parisian named Charles Perrault, and a French countess, Madame d'Aulnoy. And now we can see how grateful we should be for many of our happiest hours to that forgotten Straparola, for we are told that both Perrault and the countess got most of their ideas from his writings.

He must have been a kindly old gentleman, this Monsieur Perrault—who was busy with the affairs of state, being the official in charge of the royal buildings, and a member of the great French Academy—to have found time for telling his own children these charming stories, and then for writing them down to delight the children of all the world. He was nearly seventy years of age when his principal book of fairy stories appeared, and in dedicating it to one of the young princes of France he made believe the stories were told by one of his own children, which was only a pretty device for commending them to other young folk; for Perrault, though a very learned scholar, was not ashamed to set the fashion of writing fairy stories, which now became very popular with ladies



CAESAR.



SPENCER.

and gentlemen of leisure. The proper title of his book was *Stories or Tales of Past Times*; but it had another and better title, *Tales of Mother Goose*.

**THE GRAND LADY WHO WROTE THE
TALE OF CINDERELLA**

One of the many grand ladies who lived in France at the same time as Perrault and amused themselves by writing stories was Madame d'Aulnoy. Her tales and Perrault's are still used for pantomime, a form of entertainment very popular at Christmas time among English children, who flock to see it every year. The *White Cat*, The *Yellow Dwarf*, The *Fair One* with the *Golden Locks*, *Cinderella* and many another nursery favorite was shaped by the pen of Madame d'Aulnoy from the earlier tales of Straparola. There were many other ladies who, about this time and somewhat later, practiced this delightful art of weaving fairy tales, but none of them calls for notice; and as they all borrowed from that little-known writer who plied his pen by the sparkling waters of Venice a hundred years before them, our thanks for the pleasure of these old tales are perhaps more due to him.

The names of the authors of whom we have been reading so far may be unknown to most of our readers, but we come now to those whose names are familiar.

**THE BROTHERS GRIMM, WHO WROTE
DOWN THE GERMAN FAIRY STORIES**

What delight is associated with the otherwise forbidding name of Grimm! *Tom Thumb*, *The Queen Bee*, *Hansel and Gretel*, *The Frog Prince*, *Rumpelstiltskin* and ever so many other stories that boys and girls for a hundred years and more have been reading with endless entertainment, were all written down by two brothers named Grimm, who lived in Germany during the first half of the last century. Jacob Grimm was the elder of the two brothers, having been born at the town of Hanau on January 4, 1785, while his brother Wilhelm was born on February 24, 1786.

These two brothers were probably not in the least like the sort of people one would expect to be fond of telling fairy tales. As a matter of fact, they were sober, industrious scholars whose whole lives were devoted to literary studies and teaching, both of them becoming professors at the University of Berlin. Grave and learned gentlemen they were, whose greatest concern was to produce books of

a kind that only students read; and yet they quite unconsciously made themselves famous forever by collecting the old German fairy stories into a book which has been translated into all the principal languages of the world, and has made the name of the brothers Grimm as well known in England and America as it was in their native land.

Going out together, among the country-people of Germany, these two industrious scholars induced them to tell such stories as they knew of the fairies. What a charming occupation, and how delightful were the results!

**HANS CHRISTIAN ANDERSEN, THE LONG
AND LANKY COBBLER'S SON**

The other name that stands beside those of the Grimms in fame is that of Hans Christian Andersen, the great Danish story-teller, who is really a much abler writer than the Grimms. Hans Andersen was certainly one who knew the fairies; for most of his wonderful stories, such as *Little Klaus and Big Klaus*, *The Little Mermaid*, *The Tinder-Box*, *The Wild Swans*, *The Ugly Duckling* and *The Snow Queen*, were told to him not by the peasant-folk, but by the fairies of his own brain. We might almost say that, while Hans Andersen knew the fairies, the Grimms, and the others we have spoken about, knew only the folk who knew the fairies.

A wonderful and a strange man he was, this Hans Christian Andersen. The son of a poor cobbler, he was born in the year 1805 in the ancient city of Odense in Denmark. The poor cobbler was a learned man in his way, and used to read books at night with his son Hans, who was growing up a long, lanky lad. But neither his father nor his mother was strict enough about the boy's attending school; so, as a boy, his education was very irregular. He was perhaps more sensitive than most children, being of a nervous, highly strung nature, and his mother found it necessary to arrange at the first school he attended that he should never be punished. One day when the teacher, forgetting this, gave him a slight tap with the rod, he immediately took up his books and slate and marched off home. His mother then sent him to another school, where among the scholars was a tiny girl who told Hans once that her ambition was to be a dairy maid at a large country house.

HANS ANDERSEN'S DREAM OF FAIRYLAND



Hans Christian Andersen was the greatest of all the writers of fairy tales. His mind was like a wonderland thronged with fairy folk, and in his stories he tells us what these little people of his dreams do. Here we see him seated in thoughtful mood, with many of the fairies to whom his pen has introduced us busy in the air about him. If we read his stories we shall know these quaint little beings as though they were old friends.

WHAT HAPPENED WHEN HANS ANDERSEN TOLD HIS FIRST FAIRY TALE

"You shall be a dairy maid at my castle when I am a gentleman," said the boy in jest, and he drew upon his slate a rough picture of what his castle was like. The little fairies of the brain were already at work prompting him to tell strange stories about himself. So he went on to assure the little scholar that he was really of noble birth, but that the fairies had changed him in his cradle. The girl was very matter-of-fact, and she only replied to his fanciful tale by turning to some playmates and exclaiming, "He is mad, like his grandfather." Alas, it was true his grandfather was weak-witted, and this unhappy reception of one of his earliest efforts to tell a fairy story must have filled the sensitive boy with dread.

His father died when the lad was eleven, and even at that age Hans had made very poor use of his schooling, dreaming and idling his time away. Now he stopped going to school, and spent his days over some puppet actors and a toy theatre he had made.

HOW HANS ANDERSEN WENT OUT TO MAKE A FORTUNE, AND WHAT HE DID

It was not very long before he had a stepfather, and soon the boy began to think of making his way in the world by going to Copenhagen, the capital of his country. It was all because of having appeared on the stage of the theatre at Odense in a very tiny part in Cinderella, and having written a boyish play which he thought good enough for the stage, that long, dreamy Hans, the laughing-stock of all the lads of Odense, set off on the coach with a little bundle packed by his mother and the sum of only nine dollars in his pocket, to seek fame and fortune in Copenhagen. Many a sad and hungry day he was to have before becoming famous. At last he found a good friend, and the king himself became so interested in Hans as to have him sent to school again. But, even after his name was known throughout Europe, Andersen was so poor a man of business, and made so little money from his stories, that he had grown into an old bachelor before he could have afforded to marry. So he never had any children of his own to listen to his fairy tales, which have charmed the children of all the world. Nor did he himself think much of these tales at first. His ambition was to be

a great dramatist or novelist or poet. Some success he had in each of these branches of the literary art, and indeed, for a time, was made famous by the novels which he wrote.

His fairy stories were written at first to please his own fancy or to entertain the children of friends in Copenhagen. But, you see, it was fairy stories the world wanted him to write, and although his novels, his poems and his plays are seldom read by anyone now, the world will never let the fairy tales of Hans Christian Andersen, the poor cobbler's son, who died in 1875, be forgotten.

NATHANIEL HAWTHORNE, WHO WROTE THE WONDER BOOK

One of the most delightful of the world's writers of fairy tales lived and died in a pleasant corner of America, in New England, and he it is who next claims our attention—Nathaniel Hawthorne. He, too, was born in an old-fashioned town and lived among old-fashioned people; for Salem, in the state of Massachusetts, some fifteen miles distant from the great city of Boston, was one of the old homes of the Puritans. It was there that Hawthorne was born in the year 1804. His ancestors for generations had been seafaring folk. Nathaniel's own father, indeed, never returned from one of his long and dangerous voyages.

Hawthorne seems to have been an imaginative, sensitive boy, proud of his brave forefathers and his beautiful mother. He entered into all sorts of boyish games; but, meeting with an accident while playing ball, was crippled for a time, and during those days he became a great reader. He was very fond of *The Faerie Queene* and *The Pilgrim's Progress*. A little later he had another illness, and, during the long weeks he was an invalid, found his best pastime was book-reading. So, his accident and his illness were not altogether misfortunes if they stored his young mind with much of what is best in English literature. When he himself came to write down stories of the people he had known and the life of old Salem, the richness of his mind, as the result of his early reading, could be seen in the beauty of his literary style.

Nathaniel Hawthorne had written a great many beautiful stories before he began the book which endears his name to all young people and entitles him to

come into our little company of those who knew the fairies. This is called *The Wonder Book*, and it is surely one of the most delightful series of fairy stories ever written.

**THE IRRESISTIBLE LEGENDS OF GREECE
TOLD OVER AGAIN**

The author's own children were just tiny tots when he wrote *The Gorgon's Head*, *The Three Golden Apples*, *The Dragon's Teeth*, and ten other stories that every boy and girl must read. They tell over again with a wonderful freshness, and in a way that is altogether unique, the always enchanting legends of Greece. As soon as he wrote these stories he read them to his own children, who were so keen to hear and so clever to remember, that they could repeat most of *The Wonder Book* by heart before it was printed.

For grown-up readers Hawthorne wrote several fine novels, one of which, *The Scarlet Letter*, is the work which made his name most famous. Much of his writing was done in Concord, Massachusetts, and other quiet New England towns; but he spent seven years in Europe, five of them as American consul at Liverpool. He died in 1864, and was buried in Concord.

**THE STORY-TELLERS OF IRELAND, A REAL
HOME OF FAIRIES**

Ireland is a real home of fairies, the Irish people having had in the old days far more stories of the "wee folk," as the fairies are often called, than the English. So it is surprising that there are not more Irish story-tellers to mention in the present company. Perhaps Thomas Crofton Croker, who was born in 1798 and died in 1854, is the most notable of those who, like the brothers Grimm, collected and recorded the folklore of his country. He wrote a fascinating book called *The Fairy Legends and Traditions of the South of Ireland*, which we know that the famous Scotch writer of romantic tales, Sir Walter Scott, took true delight in reading.

But more interesting than Croker and a closer friend of the fairies—for they must have come to her, as she could not go to them—was a blind Irish lady named Frances Browne, who wrote *Granny's Wonderful Chair*. The fairy stories told from *Granny's wonderful chair* are full of delicious fancy and bright with pictures of nature. Yet it would not be too much to say that there is nothing so won-

derful about them as the fact that their gay and lively scenes could have been described by a poor woman whose eyes had never looked upon the beauties of nature. Frances Browne was blind from infancy, but she must have had that "inner vision" which enables its possessor to see into the mysteries of life with the eyes of the soul.

A remarkable figure in many ways was this poor Irish woman, and since she had not the use of her eyes, she developed the use of other faculties. For example, while her brothers and sisters were saying their lessons aloud for the next day at school she would learn their lessons by heart, and to induce them to read to her she began inventing stories from her own imagination.

**THE BLIND IRISH LADY WHO WROTE
GRANNY'S WONDERFUL CHAIR**

When only seven years of age Frances Browne had composed a poem; but at fifteen she was so impressed with the inspiring music of Homer's *Iliad*, when that was read to her, that she had her own poor childish efforts destroyed, and did not again attempt to compose poems until she was twenty-four. From that age onward she composed much charming verse and many stories, removing from her Irish home to Edinburgh, where she became a busy contributor to some of the magazines.

Granny's Wonderful Chair she wrote in 1856, after settling in London, and it immediately became the favorite fairy-story book of the day. Her last novel was written in 1887, when she was seventy-one years of age. The life of Frances Browne, though one of comparative poverty, was rich in the pleasures of the imagination. Rare is the joy her fairy stories have brought, and still bring, to multitudes of readers.

That fine novelist and admirable Christian gentleman, Charles Kingsley, must be included here, for did he not write *The Heroes* and *The Water Babies*, which he must have had from the fairies? And John Ruskin must be given place, for he wrote *The King of the Golden River*, a perfect fairy tale. But we shall tell more about them among the writers of the world's great books, and so we pass to one who is surely the leader among all our modern explorers of fairyland—none other than the creator of *Alice in Wonderland*.

**THE CLEVER STORY-TELLER WHO
TAKES US ALL TO WONDERLAND**

On the title-pages of his books we know this most celebrated of modern fairy-story tellers as Lewis Carroll, but in real life he had a different and less attractive name—Charles Lutwidge Dodgson. We shall call him Lewis Carroll, however, as under that pen-name—made by changing and turning about his first and second names—he became the favorite story-teller for boys and girls.

Everybody, of course, has read Alice in Wonderland, and perhaps his other fairy books as well—Through the Looking-Glass, The Hunting of the Snark, and Sylvie and Bruno. It is quite unnecessary to recall the names of the many strange characters, such as the Mad Hatter, Tweedledum and Tweedledee, the White Rabbit, the Mock Turtle and the rest of that varied throng with which every boy and girl, once having found them, loses no time in making acquaintance.

But what sort of man was he from whose brain of teeming fancies these strange and delightful features came? Should we picture him a jolly, middle-aged gentleman, leading a life free from care, and happiest with his children round his knees, telling stories?

**LEWIS CARROLL AND LITTLE ALICE,
THE DEAN'S DAUGHTER**

Such a picture would be curiously far from fact, for Lewis Carroll was in certain ways as unusual a character as some of his own fairy folk. In the first place, he was, of all things in the world, a mathematician, and lectured at Oxford University on that science which is the terror of most young scholars. Perhaps it was because he spent so much time over difficult problems in mathematics that he liked to clear and refresh his brain with humorous thoughts and happy fancies, which he turned into the form of fantastic stories for the amusement of the children of his friends.

Perhaps he was just a little "moody," being sometimes rather a dull companion to grown-ups, and although he was sixty-six years of age at the time of his death, on January 14, 1898, he had never been married. But, though he was an "old bachelor" for many years before his death, he was a comparatively young one when he wrote his immortal story of Alice's Adventures in Wonderland, first published in 1865. It is most interesting

to know how he came to write this story. There really was a little girl named Alice, one of many little girls who were delighted when Lewis Carroll came to visit their parents, as they had never any difficulty in getting him to tell a story. The real Alice was a daughter of Dean Liddell, and she herself has told us how this captivating tale was first begun to entertain three little English girls, all on a pleasant summer afternoon.

**HOW LEWIS CARROLL TOLD ALICE A
STORY ON THE RIVER BANK**

We cannot do better than let the words of the real Alice be heard again. "Most of Mr. Dodgson's stories," she says, "were told to us on river expeditions to Nuneham or Godstow, near Oxford. My eldest sister, now Mrs. Skene, was Prima, I was Secunda, and Tertia was my sister Edith. I believe the beginning of 'Alice' was told one summer afternoon when the sun was so burning that we had landed in the meadows down the river, deserting the boat to take refuge in the only bit of shade to be found, which was under a new-made hayrick. Here from all three came the old petition of 'Tell us a story,' and so began the ever-delightful tale.

"Sometimes, to tease us—and perhaps being really tired—Mr. Dodgson would stop suddenly and say, 'And that's all till next time.' 'Ah, but it is next time!' would be the exclamation from all three, and after some persuasion the story would start afresh. Another day, perhaps, the story would begin in the boat, and Mr. Dodgson, in the middle of telling a thrilling adventure, would pretend to go fast asleep, to our great dismay."

Is not that a pretty story of how the gate was opened that leads us into Wonderland? Lewis Carroll himself has told us of that afternoon when little Alice Liddell and her sisters first induced him to begin describing Wonderland, for at the opening of his book we read of it in these lively verses:

All in the golden afternoon
Full leisurely we glide;
For both our oars, with little skill,
By little arms are plied;
While little hands make vain pretence
Our wanderings to guide.

Ah, cruel Three! In such an hour,
Beneath such dreamy weather,
To beg a tale of breath too weak
To stir the tiniest feather!
Yet what can one poor voice avail
Against three tongues together?

Anon, to sudden silence won,
 In fancy they pursue
 The dream-child moving through a land
 Of wonders wild and new,
 In friendly chat with bird or beast,
 And half believe it true.

And ever, as the story drained
 The wells of fancy dry,
 And faintly strove that weary one
 To put the subject by,
 "The rest next time," "It is next time!"
 The happy voices cry.

Thus grew the tale of Wonderland;
 Thus slowly, one by one,
 Its quaint events were hammered out—
 And now the tale is done;
 And home we steer, a happy crew,
 Beneath the setting sun.

HOW LEWIS CARROLL FOUND A GIRL READING ALICE IN THE TRAIN

We could go on to tell so many stories about this dear friend of the little girls that there would be no space left for all the other people that must come into this book, and, indeed, a large book has been written about his life; but one little story we must find room for. He was traveling in a railway carriage one day with a lady and her little daughter, neither of whom he knew. The girl was reading his famous book, and he, who always pretended that Mr. Dodgson was no relation of Mr. Lewis Carroll, began talking to the little reader about Alice in Wonderland. At this her mother joined in and said:

"Isn't it sad about poor Mr. Lewis Carroll? He's gone mad, you know."

"Indeed," said the astonished author, "I had never heard that."

"Oh, I assure you, it is quite true: I have it on the best authority!"

A few days later the little girl received a copy of *Through the Looking-glass* inscribed with her name and the words: "From the author, in memory of a pleasant journey."

It was not only to little girls that Lewis Carroll told his stories. Little boys also were his friends, and one of these was Greville Macdonald, whom he almost convinced on one occasion that it would be an excellent thing to have a marble head, as there would then be no need to comb his hair!

GEORGE MACDONALD, AND THE MEN WHO WROTE BRER FOX AND MR. TWO-LEGS

The father of this lad was a very famous man—a great preacher, a poet and the author of many fine novels. His name was George Macdonald. He, too,

was one who knew the fairies. Though he did not invent such strange and amusing characters as Lewis Carroll has imagined for us, yet he wrote many books of fairy tales—At the Back of the North Wind, The Princess and the Goblin and others. Not very long ago his son Greville, who is now a well-known physician and has long known how impossible it is to have a marble head, prepared a new edition of his father's famous fairy stories. George Macdonald was born in the north of Scotland in 1824 and died in 1905.

Joel Chandler Harris, the American writer, who was born in 1848 and died on July 4, 1908, told those delightful negro tales of Uncle Remus, in which Brer Fox and Brer Rabbit and the Tar Baby have such astonishing parts to play. In 1908, too, another writer of fairy tales died. This was Carl Ewald, of Denmark, who had been born in 1856. Although very well known as a writer of novels and poetry, Ewald is best remembered for stories of the sort that Hans Christian Andersen made. They were written in Danish, but have been translated under such names as Two-Legs, and The Spider and Other Tales.

THE BEST OF ALL THE FAIRY PLAYS, PETER PAN AND THE BLUE BIRD

"Now," you ask, "what about our fairy plays Peter Pan and The Blue Bird?"

Who but Sir James M. Barrie, creator of a new world of fancy, could have made a play about Never-Never-Land and Peter Pan, the boy who lost his shadow? If ever you have watched Peter, in the play, teaching the Darling children how to fly, I am sure you have felt confident that you could spring up and fly, too. Born in 1860, in a little Scotch village, Barrie had become a popular and beloved author before he was forty. Such tender, delicious fantasy and such whimsical fun ripple through his lines that we are always sorry to come to the end of one of his plays or stories.

Maurice Maeterlinck, the Belgian poet, was born in Ghent, in 1862. In his fairy play *The Blue Bird* we find ourselves in another world of make-believe—a dreamy world of mystic ideas and symbols, where we wander with Mytil and Tytyl on their quest for the bird that brings happiness.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 3381.

JOHN RICHARD GREEN'S ROAD TO FAME



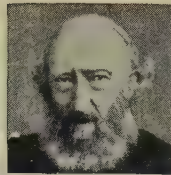
The invalid historian John Richard Green dictates from his couch his book on *The Making of England*. Earlier in his life he had written his *Short History of the English People*, and expanded it into a work of four volumes. This book is deservedly popular. Green died at Mentone in March, 1883.



Edward Gibbon.



E. A. Freeman.



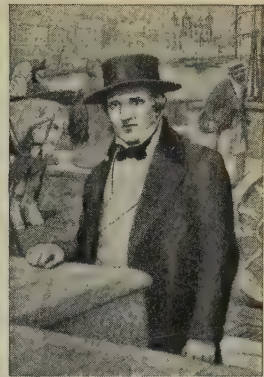
S. R. Gardiner.



Henry Hallam.



William Stubbs.



Lord Macaulay.

THE HISTORIANS



IN this survey of literature we are speaking only of those books which we like for the attractive way in which they are written.

Other books may be valuable for study, yet not be literature to be read with delight, or because of interest in the style in which they are composed. This is so particularly with books of history. Because history in books for study has often been dull, a good deal of it is first heard of in the form of stories. It is only late in the history of a country, as a rule, that its life can be pictured seriously, yet with the charm of a tale that is told. If that stage is reached, history has become true literature.

The stage was reached in ancient Greece and ancient Rome. Quite a thousand years passed after England had become a settled country before its story was told in a style that added the country's story to the country's literature. Records were kept and annals compiled, and fragments of fine history, or the materials for history, were penned. But for a thousand years no great historical writer appeared to take a wide view of the national life that now has grown into the great British Empire.

Looking back from the early twentieth century, we can now see that nothing like history, broad enough and fine

enough to be lasting, was written in English before late in the eighteenth century.

There was an abundance of splendid material, but it was not built into a book that was a national monument. Men wrote histories of their own times; but no one can write a true history of what is happening while he lives. He can only put together some of the materials of history by saying what he saw and felt and thought, from his special point of view. Then, later historians, who will know more than he knew, will compare what he says with what other onlookers have said from other points of view. So, at last the world will have a fair history.

Clarendon's History of the Great Rebellion, for example, is literature, but it is not at the same time true history. It is only a contribution toward the making of history. The writing of final history demands a special mind, broad and tolerant with the power of balancing opposing opinions. No man can have that mind if he is a fighter in the midst of fierce strife, as Clarendon was.

His book is literature because it is finely written, but we must always read it in full memory of the writer's own point of view. As the right-hand man of Charles I, Clarendon summed up his character sketch of Oliver Crom-

well in these words: "He will be looked upon by posterity as a brave, bad man." Clarendon did not foresee that we to-day should not look on Cromwell as he had described him, but should, because of that judgment, look on Clarendon himself as a blind and one-sided historian.

We mention this instance of twisted history because it shows how the historian must always be put to a double test, the test of writing in a style which charms us by its literary qualities, and the test of forming just judgment.

EDWARD GIBBON, WHO WROTE THE FINEST HISTORY IN THE WORLD

The first great English writer of history did not write of England. He wrote a vast historical survey of *The Decline and Fall of the Roman Empire*. This was Edward Gibbon.

Gibbon's history of the Fall of Rome is known throughout the world as the most impressive piece of historical writing in the English tongue. Its survey covers the known world for 1,300 years. As a marvel of wide knowledge, accuracy and fair judgment, it stands alone. Much new knowledge has been gained about the distant past since Gibbon lived, and his history has been expanded here and there; but no one has ever treated the subject better.

In style Gibbon sought to give his book the dignity of its subject, and in that he succeeded. His narrative passes on with a stately march. Its magnificence never flags. The past parades before us as a gorgeous pageant. It was well that, once for all, such a book, worthy to endure, should be written in the English language on a scale that gives modern nations their right proportions in the world's history. Gibbon triumphed in a great task for which we have profound respect. Probably no one who has had to venture again and again in his huge history would wish it to be different; but his success made historical writing heavy for fifty years, till it almost died of dignity.

Gibbon, who was rather a queer sort of boy, was born at Putney, now a part of London, but then a rural village, on May 8, 1737. His father was a country gentleman. His mother died when he was young. So an aunt undertook the care of the strange, nervous little boy, whose head seemed almost too big for his body. He was sent to Westminster School when twelve years old. There

for two years he led a very unhappy life. About two years later he went to Oxford, where he was noted more for the out-of-the-way nature of the knowledge he had acquired by his ill-ordered reading at home and school, and his ignorance of the commonest affairs, than for any student-like qualities.

GIBBON'S LIFE BY THE BLUE WATERS OF LAKE GENEVA

Gibbon was only seventeen when his father decided to send him abroad, not only for the sake of his education, but in order to change his religious views. The youth at Oxford had been inclined to the Roman Catholic Church, so his father chose to place him under a Protestant pastor in the beautiful town of Lausanne, on the Lake of Geneva. There, owing to the influence and teaching of the pastor, the young man returned to the Protestant faith, to which he ever after adhered.

For five years he continued to live by the blue waters of the famous lake, in the household of the French pastor, during which time he carried on such studies in French and Latin literature as stored his mind, thanks to his wonderful memory, with historical knowledge unequaled by any other of his age. It was during these early days in Lausanne—for to the end of his life Gibbon was fated to have association with that town—that the only romance of his quiet and bookish life took place. He was about twenty years of age, a small-boned and very thin youth at the time. The young lady was Mademoiselle Suzanne Curchod, and she was the daughter of a poor village pastor living in Burgundy. She was clever, but natural; refined, but not priggish; Gibbon found her everything that he considered a woman should be. He made visits to her father's house in Burgundy and saw the young lady there in the charming atmosphere of a very poor, but very refined, home circle. His heart told him that here was his hope of earthly happiness. But on a visit home he learned that his father would not hear of such a match.

"Without his consent," says Gibbon, "I was myself destitute and helpless. I sighed as a lover; I obeyed as a son."

It is a strange fact that these two young people, who met in early life, and cared for each other when they were both poor, humble and obscure, should both have lived to become famous. But so

it happened. It was at Lausanne, where he had first met the charming daughter of the poor pastor, that Gibbon concluded his immortal history and became one of the first men in Europe.

THE FAMOUS WOMAN WHO MIGHT HAVE BEEN THE WIFE OF A FAMOUS MAN

On the death of her father, Suzanne Curchod, left penniless, retired to Geneva, and there kept body and soul together for herself and her mother by teaching. It chanced that Monsieur Necker, one of the richest bankers in Paris, came on a

most fascinating story in all history came to him—the decline and fall of the wonderful city among whose ancient ruins he was musing. But not until two years after his father's death, which took place in 1770 and put him in possession of a moderate fortune, did he begin the great task. He had then settled in London, where he was a friend of Doctor Johnson and a member of his literary club, and he succeeded Goldsmith as Professor of Ancient History at the Royal Academy. Gibbon was a member of Parlia-



Edward Gibbon was the author of one of the finest histories that have ever been written. At the age of twenty-five, with enthusiasm, he visited Rome and trod each historic spot with entranced interest. While there the idea of his life-work came to him. "It was at Rome, on the 15th of October 1764, as I sat musing amidst the ruins of the Capitol, while the bare-footed friars were singing vespers in the temple of Jupiter, that my idea of writing the decline and fall of the city first started to my mind."

visit to his native city and there fell in love with the humble and beautiful governess. He married her and took her to Paris. Monsieur Necker became one of the greatest statesmen in France, his wife became famous for her beauty and her goodness, and their daughter, Madame de Staël, attained world-wide celebrity, which continues to this day.

When touring in Italy in 1764-65, Gibbon sat musing amid the ruins of the Capitol of Rome, while some barefooted friars were singing vespers in a church that had once been the Temple of Jupiter. It was then that the idea of writing the

ment for nine years, but retired in 1783. He then went back to Lausanne, and four years later had finished the work of his life on which his fame will rest secure.

THE END OF A GREAT TASK AND THE WRITING OF AN IMMORTAL WORK

Gibbon never married. The romance of his boyhood lasted to the day of his death. But the writing of his great history was, perhaps, the true romance of his life. "It was on the day—or, rather, night—of June 27, 1787," he tells us, "between the hours of eleven and twelve, that I wrote the last page, in a summer-house in my garden. After laying down

my pen, I took several turns in a *berceau*, or covered walk of acacias, which commands a prospect of the country, the lake, and the mountains. The air was temperate, the sky was serene, the silver orb of the moon was reflected from the waters, and all Nature was silent. I will not dissemble the first emotions of joy on recovering my freedom, and, perhaps, the establishment of my fame. But my pride was soon humbled, and a sober melancholy was spread over my mind, by the idea that I had taken an everlasting leave of an old and agreeable companion, and that whatsoever might be the future fate of my history, the life of the historian must be short and precarious." Broken in health, Gibbon returned to London in 1793, and there died suddenly on January 16, 1794.

Gibbon is described as a dutiful son, a tender, generous friend; and Lord Brougham said of him that "his honourable and amiable disposition, his kind and even temper, were praised by all."

The men who came after Gibbon tried to write as he did. They had not his talent and their histories were very long and dull. With Macaulay things changed again. He made a tremendous difference in the writing of history. The solemn orderliness of Gibbon was not for him. He raided territory here and there, as if with glittering cavalry charges.

Macaulay, as a writer, was as different from Gibbon as it was possible to be. As an eager leader from his earliest boyhood he resembled the historian of Rome, but in little else. Gibbon sat calmly in his library and wrote without any likes and dislikes, intent on guarding himself against unfairness, even when Christianity and paganism were in conflict. Macaulay was a politician and a fighter by tradition and instinct. He was happy while he had someone or something to fight. If it was a man he was writing about, he made up a stirring fight between his weaknesses and his virtues. If it was a cause he was presenting to his readers, he invariably threw in his weight on one side.

HOW MACAULAY MAKES THE PAST LIVE AGAIN BEFORE OUR EYES

Just as Doctor Johnson, when reporting speeches in Parliament, saw that the "Whig dogs" had the worst of the argument, so Macaulay was minded that the Tory dogs, the Cavaliers, the Stuarts and

all those against the principles of freedom, as he understood them, should be defeated when he had finished with them. He would have denied that this was prejudice: to him it was sheer right and eternal justice. In short, he was an enthusiastic supporter of one side. But an enthusiastic supporter cannot be an ideal historian. So we must read Macaulay, like Clarendon, with ample allowances for his personal point of view.

But the defects of this alert, energetic and believing man's temperament, as a calm historian, were a blessing to the writing of history. He wrote so interestingly, because he was interested, that he set up a new standard for telling the life of the past. His work remains as an example of brightness and living power, and nobody can any longer make history seem dull for very shame. We may not agree with Macaulay, and feel inclined to meet his challenge and fight him, both on what he thinks and on the way he writes it. We cannot well be indifferent.

Macaulay did not write history on the great scale of Gibbon. He began with what he called Essays, that pretended to be reviews of books. Really they were probings by himself into the history of various times and men dealt with in the books he was noticing. The books he reviewed were used merely as pegs on which to hang his own opinions. By dashing raids into history in many directions he covered a good deal of historical ground. Then he settled down to write the part of the History of England that ends in the firm establishment of constitutional government under William III. This occupied him about nine years and remained incomplete.

Thomas Babington Macaulay, though born at Rothley Temple, Leicestershire, on October 25, 1800, was of Scottish ancestry.

MACAULAY, THE CLEVER BOY WHO HATED MATHEMATICS

Like most of the others we have read about, he was an exceptionally clever boy, the one study he detested being mathematics. He passed from private schools to Cambridge University in 1818, and there carried off prizes for English verse and Latin oration. But, unlike many other celebrities, his college life was well-ordered, studious and distinguished.

Macaulay was called to the bar in 1826,

but literature was his passion, and as he had made a name for himself the year before by an essay on Milton in The Edinburgh Review, he made no effort to rise to a position at the bar.

His great talents were now devoted to writing in The Edinburgh Review, and his powers of oratory were seen to advantage in the House of Commons, where he became a distinguished member. His father, who had been a man of wealth, was so generous a giver to charities that he had almost impoverished his family; and chiefly for this reason Macaulay, at the age of thirty-four, accepted an important legal position in India with the splendid salary of \$50,000 a year. But four years later he returned to England and again entered Parliament, and became Secretary for War. Many other important posts were later occupied by him, and no man's days can have been fuller, for he wrote continuously in addition to discharging his public duties.

THE WRITINGS THAT HAVE MADE LORD MACAULAY FAMOUS

His Lays of Ancient Rome, in which he sang in swift and flowing verse some of the great deeds in Roman history, gave him world-wide popularity, while his collected essays were also read by everybody, and admired for the vigorous and direct style of the writing. His History of England had also an immense success, greater, perhaps, than any work of the kind had ever enjoyed.

For all these, Lord Macaulay, who was raised to the peerage in 1857, has a sure place among the great English writers. On December 28, 1859, he died in his armchair at Holly Lodge, Kensington, and was buried in Westminster Abbey.

Since the death of Macaulay history has been written in England by one writer who, with great success, glanced rapidly over the whole of the country's story. A number of other writers have concentrated with intensity and close industry on limited periods, and have sought to weigh all evidence with scientific fairness. The successful writer was the famous John Richard Green, a London clergyman in frail health, who wrote with graceful vigor and fine feeling. He fully sustained the interest that history should always command, seeing that it is the story of human life in its most active moments. Green's Short History of the English People is one of the most arresting

books in the English language, and will live long after our generation has passed away. Green went on with his writing, dictating to his wife when he was so weak that he was confined to his bed. After his death she was able to complete some of the tasks he had left unfinished.

HISTORIANS OF GREAT EPOCHS IN THE NATION'S HISTORY

The division of history into sections, either by subjects or by periods of time, so that study may be more minute and may thus arrive at the facts, led to the making of Constitutional histories, based on the doings of Parliament and on law. Thus we have the works of Henry Hallam and William Stubbs, very necessary but apart from life.

The general history of Samuel Rawson Gardiner, fuller of fact but less picturesque than that of Green, is a good example of solid workmanship of its kind. Gardiner, too, was a detailed worker in the Stuart and Commonwealth periods. He helped to set the fashion of painstaking study of historical documents which has now been developed in the older universities.

Among the historians of the nineteenth century who wrote works monumental in size was Edward Freeman. His Norman Conquest was crammed with knowledge too dryly conveyed to be reckoned as literature. His particular opponent is James Anthony Froude, whose History from the Fall of Wolsey to the Spanish Armada is charming literature but very doubtful history, owing to its writer's habit of being inaccurate. John Lingard's History of England in ten volumes is a work of ability and research. It is interesting because it shows the point of view taken of certain events in English history by a devout, able and learned Roman Catholic.

THE PANORAMA OF HUMAN LIFE TOO GREAT FOR ONE MAN'S PEN

History, as studied at the present time, does not lend itself to the writing of great books that may be landmarks in literature. Those who take it as their task are the gatherers of materials for rebuilding soundly our knowledge of short periods. Histories are the work of many minds, each fixed upon a limited area, their united energies producing such great works as the Cambridge Modern History and the Chronicles of America.

THE NEXT STORY OF LITERATURE IS ON PAGE 3311.

A PICTURE OF NATURE'S FRAMING



This is the peaceful valley of the Hood River in Oregon, with snow-covered Mount Hood in the distance. This mountain is in Hood River County and is more than 11,000 feet high. The melting snow from its top and sides feeds many streams. Hood River, which gives the valley its name, is one of them. Every year many climb over the glaciers to the lofty summit of the mountain to enjoy the magnificent view.

The Book of THE UNITED STATES



A great oil refinery at Richmond, near San Francisco.

THE UNITED NATION

PART II

IN one story in Volume Eight we told of recent events, and then went on to describe some of the things which our country produces. We spoke of what we may call the vegetable products. Now let us go on to speak of the animal and mineral products. We shall also tell what we make of all their products.

First let us speak of the animals. You have roast beef or steak for dinner sometimes, and you know the animal that furnishes it. Perhaps, if you live in the country or in a small town, you have a cow or several cows in the barn, and you know that farmers raise cattle for the butcher. But where does the meat for the great cities come from?

You have perhaps read of the great cattle ranches of the West. There were many of them a few years ago which included thousands of acres. In other sections were millions of acres of government land over which cattle ranged, living out of doors all winter.

As the population has increased, much of this land has been needed for farms, and the great ranches are being broken up. So, many cattle can no longer get their living by grazing all the year, but must be fed a part of the



CONTINUED FROM 3032

likely to be much lower. Texas has the greatest number of cattle, and Iowa is next.

Nevertheless, the United States is still a great beef-producing country. We send thousands of animals to Europe alive, though not so many as we did years ago. In some of the western cities are packing-houses, where the animals are slaughtered and prepared for market. The meat is stored in cold rooms, and is carried in cold cars all over the United States, and may be put in cold rooms on ships and sent all over the world. Many million pounds are also sent in cans.

The humble hog, however, furnishes a larger value than any other animal. Hogs are raised everywhere in the United States, but the largest number may be found in the Mississippi Valley, which also produces the most corn. Iowa raises the largest number, with Illinois and Missouri next. Our country stands at the head of the producers of pork and pork products. 3207

In nearly every state sheep are raised, both for food and for their wool, but the greatest number are in western states, as Texas and California, though several other states have almost as many. In the production of wool we rank third in most years. Australia is first, the Argentine Republic is second, and Russia probably fourth, though we know very little about Russian agriculture now. We cannot send any wool abroad but must buy in great quantities in order to get enough to clothe our people.

POULTRY AND EGGS FORM A VALUABLE PRODUCT

You would hardly believe that poultry and eggs are among the most valuable products of our country. Yet it is estimated that two hundred eggs are used in this country every year for every man, woman and child. Together poultry and eggs are worth hundreds of millions of dollars every year. The prices change so often that it is difficult to say exactly how much. Iowa, Illinois and Missouri are the leading states. We produce just about enough for ourselves, but do send some eggs away.

The same is true of butter and cheese, though we do send away some butter and more cheese. The value of these two articles of food is about a billion dollars a year. Of course, the value of the milk sold in our towns and cities is many millions more. Some of this, you know, is put into cans and sent abroad. Honey and wax were worth nearly fourteen million dollars in 1919. California and Texas were the leading states, with New York not far behind.

While the sea is not precisely the United States, yet the food gotten from the water is a part of our national wealth. The value of the fish caught by our fishermen is about one-seventh of that of the whole world, and we send away great quantities of canned fish, especially salmon, which are nowhere else so plentiful as on the western coast of North America. We produce more than four-fifths of all the oysters eaten in the world, and no other oysters are so good.

In order to be certain that the fish will not be caught faster than there are new ones to take their places, the government has built fish-hatcheries at many different places. Here the eggs are hatched, and after the little fish are large enough to take care of themselves they are turned

loose in the streams and in the sea. You have already learned that some fish eat the eggs of other fish.

We also raise more horses and mules than we need, and these are sent to Europe and even to Africa and Asia. The mule eats less than a horse and will keep strong on coarse, rough food on which a horse would starve. During the World War thousands of American mules were sent across to pull the artillery and the supply wagons.

MINERAL PRODUCTS OF THE UNITED STATES

Now we come to the third great class of products, which belongs to the mineral kingdom. In minerals the United States is very rich. In fact, the value of our production is almost equal to that of all the rest of the world put together, though this will not be true when the great stores of Russia, China and Canada are really opened. Mineral products are divided into metals and non-metals.

The most valuable of all our metals, both in usefulness and in money, is iron. Our country furnishes from one-third to two-fifths of the iron of the world, and about one-half of the steel, which is made from iron. We shall tell you more of how iron is gotten from the ore and how it is then turned into steel. Three states, Minnesota, Michigan and Alabama, furnish most of the iron ore, though some is found in twenty-five states.

OUR COPPER WORTH MORE THAN OUR GOLD

Next in value to iron is copper, and of this we furnish about half of the world's supply. Copper is used for many things, but perhaps the most important use is as a conductor of electricity. Nearly all the wires you see over which electricity passes are of copper, and it is also used in electrical machines. It is necessary in making weapons of war. Much of it is also used to cover wooden ships, as it is strong for its weight and the water does not affect it very much. Arizona, Michigan, Montana and Utah furnish the most.

Next in value is gold, of which we usually furnish about one-fifth of all mined in the world. South Africa is first, of course, and then comes our country. California, Alaska and Colorado lead, and with South Dakota, Arizona and Nevada supply about five-sixths of all we produce. Some gold is obtained in about twenty-five states.

THE GREAT STOCKYARDS OF CHICAGO



© Underwood & Underwood.

Chicago is the world's greatest stock market. Cattle from a thousand miles around are sent to its great stockyards, one corner of which is shown in this picture. These stockyards, or markets, cover 574 acres of ground and give employment to 1,800 work-people. Many more thousands of men and women are employed in the meat industry in Chicago, the most important centre of this trade in the world. In the year 1830 Chicago had only a few houses; now it has over two and three-quarter millions of people.

TWO METALS WHICH ARE USUALLY FOUND TOGETHER

The next two metals are almost equal in total value and are often found together. These are silver and lead, but in most years the silver is worth a little more than the lead. Generally we produce about one-fourth of the silver of the world, which puts us in second place, with Mexico first. On account of the revolutions in Mexico, production fell off, and for several years the United States furnished more than any other country. Utah, Montana, Idaho, Nevada and Colorado lead in the production of this beautiful metal, which has so many uses you can name. Canada also produces much silver.

Lead is used for many purposes, both pure and when mixed with some other metals. Water-pipes and tanks, electric batteries and bullets are all made of lead. When mixed with tin it makes solder, with which the plumber stops the leak in the pipes; mixed with another metal called antimony it forms the type metal from which this book is printed. We produce more than any other country—nearly one-third of the yearly supply. Spain, the German states and Mexico also furnish large quantities of this metal. In our country Oklahoma, Missouri, Idaho and Montana are the leading states.

A METAL THAT IS SELDOM USED ALONE

Zinc is used to cover iron to prevent it from rusting, making what is called galvanized iron. Mixed with copper, it makes brass, which is very useful. Much is also used in the manufacture of paint, in electric batteries and in dyeing. We produce about one-third of the world's supply.

Perhaps you have seen a white metal something like silver but much lighter in weight, called aluminum. This metal is never found pure, but it is one of the most abundant elements in the earth's crust. Most clays contain it, and in combination with other substances it forms beautiful gems in the earth. An American discovered a cheap way of separating it from the substances with which it is combined, and now we produce about half that is used. This metal is likely to be much more freely used in the future, as there is much more of it in the earth than there is of iron, and the price is going down.

The only other important metal is quicksilver, or mercury, which you see in thermometers and which is also used in making explosives, in medicine and in gold-mining. More than one-seventh of the supply comes from the United States, nearly all of it from California and Texas.

SOME MINERALS THAT ARE NOT METALS

Many things that are minerals are not metals. The most important of these is coal, of which we produce between one-third and one-half of all that is mined, or almost as much as Great Britain and the former German Empire together. These three have been producing most of the coal used, though in Russia and China there are great beds which are hardly worked.

Two kinds of coal are mined, anthracite, or hard coal, and bituminous, or soft coal. Pennsylvania furnishes nearly all the anthracite, though Colorado and New Mexico have a little, and also furnishes more bituminous than any other state. West Virginia and Illinois are next, though coal is mined in thirty states.

Next in value is petroleum, of which we furnish much more than any other country, with Mexico second. Besides kerosene, gasoline, lubricating oil, vaseline and paraffin many other valuable products are obtained from this oil. It is found in Oklahoma, Texas, California, West Virginia, Kansas, Pennsylvania, Ohio and several other states. Along with oil is almost always found natural gas, for which wells are bored just as they are for oil. Many cities and towns in the United States are lighted and warmed by this fuel, which is conveyed by pipes like ordinary gas. In some cities most of the power is furnished by natural gas.

BUILDING-STONE OF MANY KINDS IS NEXT IN VALUE

Next in value of our minerals is building-stone. Some sort is found almost everywhere, and we have some of the best and most beautiful stones in the world. Marble, the limestones, the sandstones and granite are the ones chiefly used, and many different colors and degrees of hardness are to be found among them.

Vermont furnishes more marble than any other state, though Georgia and Tennessee also have much beautiful stone of many colors. Nearly every state has some limestone, but the quarries of In-

STOCK-RAISING IN NEW MEXICO



Some parts of New Mexico are becoming noted for fine stock. Indeed it would be difficult to find anywhere better specimens than those on this page. The state now stands high in the production of wool, and some enthusiastic residents say that it will yet rank higher in this industry.



This is a part of a herd of thoroughbred Holsteins kept for dairy purposes near Roswell, New Mexico. This breed is one of the best for the purposes, as it gives large quantities of good milk. The silo is at the end of the shed under which some of the cattle are standing.



The value of the hogs raised in the United States is greater than that of any other animal. These are Berkshires, one of the most popular breeds in both America and England, and are only four months old. Notice the saucy curl of their tails as they devote themselves to their food. Hogs are able to get a great part of their food by grazing, just as cattle and sheep do.

diana, Illinois and Kentucky are the most noted. Sandstone is found almost everywhere. Many states have quarries of excellent granite, but Vermont, Massachusetts, North Carolina, Wisconsin and New Hampshire furnish most.

**TWO MORE VALUABLE MINERALS
THAT ARE NOT METALS**

Salt is produced all over the world, and though the United States makes more than any other nation—about one-fourth—we do not have enough for our needs.

Glass is, you know, principally melted sand. No other country makes so much as we do, for nowhere else are there so many people who can afford to buy glassware for their tables and to use so much glass in their windows.

**SOME OTHER MINERALS FOUND
IN OUR COUNTRY**

There are dozens of other useful minerals found in the United States. The phosphate rock of Florida and Tennessee, used for fertilizer, is valuable, and so is sulphur. Grindstones are worth many thousands of dollars; borax is valuable; and so is mica, much used for stove windows and other purposes as well. We must not forget the rock from which cement is made, for this grows more valuable every year.

We must acknowledge that nature has been kind to our country. No other country has such a variety of soils on which so many different kinds of crops can be raised. In no other country do so many animals thrive, and no other country is so rich in mineral wealth. If the United States were shut off from all the rest of the world, it would not make very much difference. We should have to do without some things, but they would not be the most important. The necessities of food, clothing and shelter are all produced. Some tropical products would be lacking, of course.

**WHAT DO WE MEAN
BY RAW MATERIALS?**

It is usual to speak of most of the things of which you have been told above as food products and as raw materials for manufacturing. For example, cotton is the raw material and cloth is a finished product. Iron ore is a raw material, steel rails for a railroad are a finished product. You must remember, of course, that the finished product of one factory may be raw material for another. Cloth, for example, is the raw material for a tailor.

The United States has become the greatest manufacturing country in the world, because it has the greatest stock of raw materials and because it has cheap coal and oil, and much water power. You must remember that power is necessary to run machines, and no matter how much raw material a country has, it cannot become a manufacturing country unless it can get some sort of power to run its machines, and has also a cheap way of carrying raw material to the factories and of taking away the finished goods.

You have already been told of the coal supply of our country, and that it has many swiftly running streams. These streams are made to furnish power by means of water-wheels. Because New England has so many of these streams is one reason why manufacturing developed early in that section.

**HOW THE STREAMS HAVE BEEN
HARNESSED**

Lately there has been a great increase in the use of electric power. On many streams great dynamos to develop electric power have been built. The power is then carried by wires twenty, fifty or more miles away to the factories, which have been built where there are railroads to carry the goods or where there is a good supply of labor. In many factories, instead of great engines to run the machines, you will see only an innocent-looking wire running into one corner of the building. This wire carries more power than several engines can develop.

**HOW LABOR AND SKILL ADD
TO SELLING PRICE**

Labor and skill add very much to the value of some kinds of raw material. For example, a lump or scoopful of iron ore costs almost nothing. If made into pig iron, it is worth a little more; made into a stove, it is worth still more; made into steel for railway rails, the value increases still more. The same amount of material made into knife-blades is worth a great deal, and then, if made into springs for watches, say, is worth many hundreds of dollars.

A pound of raw cotton costs only a few cents. When made into coarse thread, the value is increased, and when this thread is woven into cloth, the value becomes greater still. Or if the cotton is spun into fine thread and then made into lace, the value may be a thousand times as much as that of the raw cotton.

TWO OF THE WORLD'S HIGHEST BUILDINGS



These are two of New York's famous tall buildings. On the left is the Singer Building, about forty stories high, much taller than any cathedral spire. The other is a corner building which is called the "Flatiron," because the front of it is narrow and the back broad. In some of these buildings as many as 10,000 people work, and the crowds going in and out make the place look like a railway station. There are stairs to the top, and elevators run all day and sometimes all night. Some of them, "expresses," go without stopping from the street floor to an upper floor.

OTHER RAW MATERIALS NOT MUCH INCREASED IN VALUE

Some other raw materials are not increased so much in value because not so much labor and skill are spent upon them. A loaf of bread does not cost so much more than the wheat out of which it was made, but even here fine pastry and cakes are sold for much higher prices.

The United States was, at first, as you have been told, almost entirely an agricultural country. Since your fathers were born the nation has become the greatest manufacturing country in the world in the value of products.

We do not yet make the finest goods of every kind, for some of them require very highly skilled labor, which requires a long time to train, but every year finer and finer goods are made. In some lines we already surpass any other country, while in others we make only the coarser grades. On some goods you have seen foreign names, or perhaps "Made in Germany." Sometimes these goods have been sold in this country because of quality and sometimes because of cheapness.

THE MOST VALUABLE MANUFACTURES OF THE UNITED STATES

Of all the manufactures of the country those of the greatest value are the food products. These are flour, meal and meat prepared for use, and similar things. They are important because without them we could not live. Minneapolis is the chief centre of the flour industry, and Chicago of the meat industry.

The next group to be mentioned is that of iron and steel and their products. The chief single item in this group is steel rails for railroads, either steam or electric. We make all our railroads need, and in far-away parts of the world you will find engines running on American rails. Pennsylvania is the chief state in such manufacture.

Much of the steel sent abroad goes in the form of electrical and agricultural machinery. Our country is the chief maker of all sorts of farming machinery, and also of sewing machines and typewriters. Some of the steel goes into the making of ships, though we have not been a great shipbuilding country.

Lumber and timber products are very valuable. A large part of agricultural machinery, tools and implements is made of wood. The same is true of horse-drawn vehicles. Motor cars are nearly

all metal. Street and railway cars are sometimes made of wood, though metal is being used more and more. Furniture must not be forgotten. In fact, the wood products are almost numberless.

CLOTH AND CLOTHING OF MANY KINDS

The next group of our manufactures is the textiles, which means "that which is woven." We may divide this group into wool, cotton, silk and linen. Then, besides, there are other classes made up of a combination of these. Our woolen manufactures are large, but we send very little abroad, as we need most of our production for our own people. In fact, we must buy much raw wool and much cloth also in other countries. Besides cloth there are carpets, stockings and knit underwear, and the like.

We make more knit goods than all of the rest of the world put together, and we make more carpets than any other country. More knit goods are made in New York State than in any other, while in carpets Philadelphia holds first place. Taking all kinds of woolen goods together, Massachusetts is the first state.

We manufacture much cotton goods, though we use only about one-half our crop of the raw cotton. This industry is almost entirely confined to the Atlantic states. The first cotton-mill was built in Massachusetts about 1790, and for many years nearly all the mills were in New England. Since about the year 1880 the number of mills in the South has been increasing, and now there are hundreds of mills in the southern states and they use more cotton than the northern.

Massachusetts is still the chief state, with North Carolina and South Carolina struggling for the second place, and Rhode Island is fourth. New Hampshire, Georgia and Alabama also manufacture much cotton. We send much cotton cloth to other countries, and some day will probably manufacture a much larger share of our cotton.

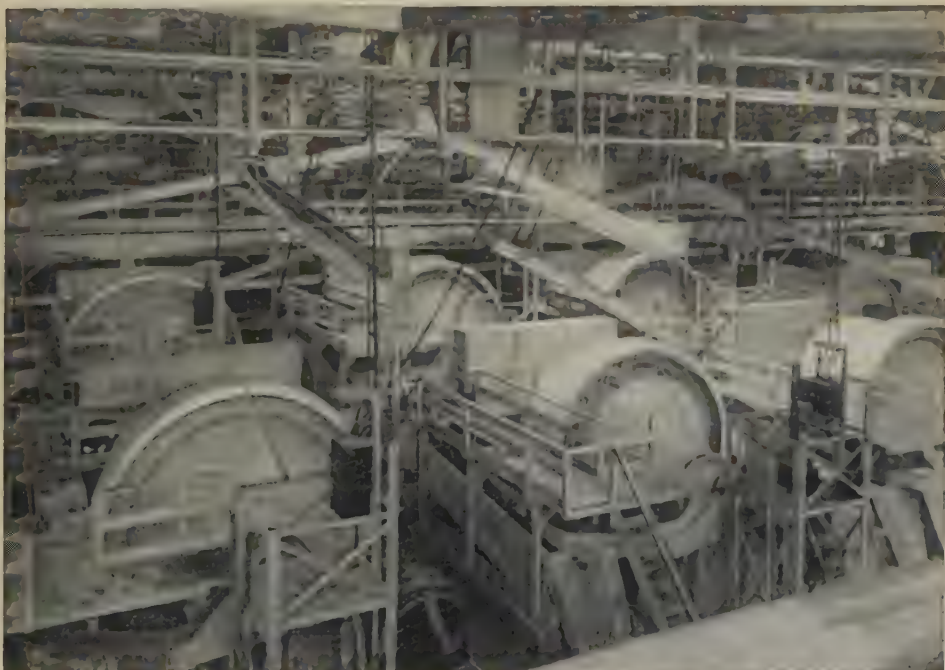
OUR SILK AND OUR LINEN MANUFACTURERS

Our country uses over one-half of the raw silk of the world, but still we do not manufacture all we need. Nearly all the raw silk used is imported. Though many attempts to raise silkworms in this country have been made for nearly two hundred years, they have not been very successful. No other country uses so

ANACONDA, WHERE COPPER IS KING



The works for smelting copper ore at Anaconda, Montana, are the largest in the world, and the Washoe Reduction Works, which are shown here, produce about one-tenth of the world's supply. The town of Anaconda has grown up around the copper industry. In the mountains around are many rich veins of copper ore, and some of the shafts in the mines go down more than two thousand feet.



Copper is not often found entirely pure, and may be reduced by several methods. This is the concentrator floor in the great establishment shown above. When finely crushed ore is placed in oily or acid liquids some of the impurities are separated. The "concentrate" must then go through other processes.

Photos, courtesy Anaconda Mining Company.

much silk as the United States, because no other people can afford to buy so much. The leading state in silk manufacture is New Jersey, with Pennsylvania next. The city of Paterson, in New Jersey, is one of the chief silk-manufacturing cities in the world. We also produce a great deal of artificial silk.

Though we grow very little flax for spinning, we bring in a great deal to be woven into cloth. The best linens are not made in the United States, however, but we make a great deal of linen crash for towels, besides much linen thread. Some cotton is often mixed with flax, and sometimes the product is sold by dishonest merchants as pure linen. Ireland, Holland and France are the great linen countries.

MORE TREASURES WHICH WERE ONCE THROWN AWAY

Next in value is the group known as chemicals, drugs and dyes. This includes fertilizers of many kinds, which furnish food for plant life. They are made from such things as phosphate rock, ground bones, potash, cotton-seed meal, and the refuse from slaughter-houses and fisheries. Medicines are made from our native plants or from plants imported from other countries and from minerals; and many kinds of dyes are also made. We have already told you that the cotton-seed was once thrown away. Around gas works and oil-refineries only a few years ago there was such a great quantity of a sort of tar left after the gas and oils had been taken out, that it was in the way. Chemists have found in this ugly black substance more hidden treasures. Some of the most valuable medicines used by our doctors are now gotten from it, as well as brilliant dyes. The value is many millions of dollars.

PAPER AND PRINTING, AN IMPORTANT INDUSTRY

The next of our manufactures in value is paper, or at least paper and printing. When you think of the number of newspapers, magazines and books, the amount of wrapping paper used by the butcher, the grocer and other tradesmen, to say nothing of the number of paper bags used every year, you can easily see how it happens that the value is so great. Then, also, there is paper for writing. Besides, too, there are hundreds of other uses for paper, of which you have probably never heard. Most paper is made wholly or

partly of wood pulp. The finest paper is made from rags, but many other fibres are used. The United States produces as much paper as all the rest of the world.

Now we come to leather, as the prepared skins of animals are called. When the skin is removed, it soon becomes dry and hard—so hard that it cannot be used for shoes or other purposes. So it must go through many processes to make it soft. We cannot stop to tell how this is done now. The chief animals whose skins are used are cattle, sheep, hogs, goats and horses. We make very little horse or goat leather in this country. In all, we make nearly a third of the world's leather, and use up not only the skins of animals obtained in this country, but many from abroad.

The number of carriages, wagons and automobiles is very large, and the value is very great; but a part of this value is in the wood and steel already spoken of. Though making motor cars, both for pleasure and business, is a new industry, it has grown very rapidly and now is one of the largest in the country. Tobacco, too, sells for many millions of dollars. We grow about one-third of all grown in the world. Of this, half is used here and half is sent to other countries.

There are many other things manufactured in this country which we have not space to mention. Nearly every little town in the states east of the Mississippi has one or more mills or factories of some sort, and there are many in the states west of the great river.

CURIOUS THINGS WHICH THE CENSUS SHOWS US

We learn some curious things if we study the long columns of figures that are sent out from the Census Office in Washington. We find that New York State makes ninety-nine out of every hundred collars and cuffs made in this country; that Connecticut makes about sixty-five out of every hundred clocks and more than half of the brassware.

Massachusetts makes over half of the boots and shoes, while New York is the centre of the clothing industry, for both men and women. This state made almost nine times as much clothing for women and almost three times as much for men as any other state, when the last census was taken. Michigan leads all other states in making motor cars. Sometimes a state leads because of nearness

WORK AND PLAY IN THE FAR WEST



Gathering oranges in a grove like this near the beautiful city of Los Angeles, California, can hardly be considered work at all. You can see blossoms as well as ripe fruit on the trees. The men pick each orange separately so that when a box is packed there will be no bruised specimens. Los Angeles is surrounded by orange and lemon groves and by fruit gardens.



Though Seattle is one of the busiest cities on the Pacific, the people have not forgotten the need of recreation. The city has a complete park system of nearly 2,000 acres connected by boulevards, besides many playgrounds. Few cities have done more than Seattle for the general welfare of the whole population. This is Volunteer Park.

Photo, courtesy Chamber of Commerce, Seattle.

to the raw material used in an industry. Sometimes the reason seems to be that the first factories built in the state were successful and other men were encouraged to build. Factories were built in New England years ago because there was so much power furnished by the streams.

Now, when we learn that a country does much manufacturing, we know that it must have easy ways of getting raw materials and of sending away what its factories make. In Holland, you were told, more goods are carried by canal boat than by railway. In many other countries a very large part of all the freight is carried by river or canal.

THE RAILWAYS OF THE UNITED STATES

Though the United States has many rivers, not very much use is made of them, as the railroad is quicker. Many canals were dug before the Civil War, but some of them have been allowed to fall into disuse or fill up. Some have been dug recently. Several important canals are in operation, however. The most important is the Erie Canal, of which we have spoken elsewhere, and the Lake Washington Canal at Seattle. Nearly two-fifths of all the miles of railroad in the world are in the United States. The number of miles is more than 260,000.

Some of these railroads run from the Atlantic to the Pacific under one management. You can go from New York to New Orleans without changing cars. The passenger cars on these trains have every convenience, and one can go from New York to San Francisco in less time and with less fatigue than the journey from New York to Boston required a hundred years ago. No other people travel so much. If all the distances traveled by passengers in the United States were divided equally, it would amount to a journey of about three hundred and fifty miles a year for every one of us.

Nearly all the railways use steam locomotives, but some are turning to electricity. In the story of the train we show you some great electric locomotives. There are many light railways which use motors built into the cars, like the street cars or like the elevated or underground railways in our cities. In some parts of the country electric railroads connect the cities and small towns, and electric locomotives also pull freight trains.

HOW THE GOVERNMENT GAVE LAND FREE TO SETTLERS

From the first settlement of the United States there has been more work than there have been workers. In the earliest days, when land was free to all, few people would work on the farms of others when with a little trouble they could get farms of their own. After the Revolution all the unoccupied land became the property of the government, and you know how possession of the land beyond the Mississippi was gained.

This land was first sold at a very low price to settlers, and later the government gave a farm of 160 acres to everyone who would work it. Many millions of acres were given away, and now there are fertile farms and thriving towns and cities where there were no inhabitants not so many years ago. The free land is not quite all gone yet.

Most of the government land, however, is not suitable for farming. Some of it is rough mountains and hills, but some of it would bear good crops if there were more rain. In some sections there are rain or snow in the winter and streams fed by melting snow in the spring. Therefore great dams have been built to catch this water, which would be wasted, and save it for times of need. In the western states millions of acres of desert have been made fruitful by means of the precious water. In other places deep wells have been sunk.

WHO ARE THE PEOPLE OF THE UNITED STATES?

Now, what of the people of our country? You were told in our Second Volume that, besides the English, some Scotch, Irish, French, Germans, Swiss and Swedes came to this country before the Revolution. For a time after the Revolution very few foreigners came, but after 1830 the number became larger, but not so many as one hundred thousand came any year until 1842. Until 1860 nearly all who came were from Great Britain, Ireland and Germany. After the Civil War the number of immigrants increased very greatly. Not so many came from Great Britain, Ireland, Germany, Norway and Sweden or any other countries of Northern Europe. Many came from Canada before 1895, but fewer come now.

After about 1890 immigrants began to come in greater numbers from Central or Southern Europe, and from Asia. Russia, Austria-Hungary and Italy fur-

IN GOLDEN GATE PARK, SAN FRANCISCO



THE CHAIN OF LAKES



BRIDLE PATH SHOWING RHODODENDRONS IN BLOOM

San Francisco's handsome park, which contains over a thousand acres, was once only sand dunes. It now contains playgrounds, a stadium, a zoölogical garden, an art museum and beautiful walks and drives. Photos, Gabriel Moulin.

nished the largest numbers. Some came to escape persecution, some to improve their condition, some to avoid military service. Some came intending to spend their lives, while others expected to work a little while, save their money and go back to their native land. Most of them came first to New York, and as they entered the harbor, one of the first things they saw was the great Statue of Liberty with her torch upraised.

They were of many races and spoke many different languages. They had not been used to free government, and many of them were very poor. They were willing to work, however, and to do the kinds of hard and dirty work which the native-born American did not like to do.

Their children went to the public schools, learned to speak English, and many of them went to high school and college. In New York City are many large merchants and manufacturers who came to this country poor immigrant boys.

Some well-known doctors and lawyers are the sons of parents who never learned to speak English well. In Europe they would not have had the opportunity to become educated, but would have been compelled to remain laborers for small wages all their lives. This country allows every boy or girl to rise as high as his or her ability and industry will permit.

FEWER IMMIGRANTS NOW ALLOWED TO COME

For many years some observers of American life had been saying that immigrants were coming in greater numbers than could be quickly Americanized. After the World War it seemed that all Europe wished to come to the United States. Congress passed an act in 1921 which limited immigration to three per cent a year of the number of foreign-born living in the United States in 1910. For example, in 1910 there were a little more than 120,000 natives of the Netherlands living in the United States. Three per cent of this number is a little more than 3,600, and this is the number of Dutch who were allowed to come to the United States in a year. The same sort of calculation was made for every other nation. In 1924 the percentage was lowered to two, and the census of 1890 was taken as a basis. This law not only lessens still further the number of immigrants that may come, but gives the advantage to Northern and Western Eu-

rope. Before 1890 not very many had come from Eastern and Southern Europe. Therefore the number who may now come from such countries as Russia or Greece is very small.

You have learned something of what the American has done in the past in the History of Our Land. In other parts of our book we tell you of the famous writers, inventors, painters and sculptors, and so shall not stop to speak of them here. But no mention of America is complete without speaking of the American's belief in education. No other country spends so much money on its schools. In every state of the Union are public schools open free for every child, and many states offer a high school besides. Some states, and even a few cities, support free colleges and universities for their young men and young women.

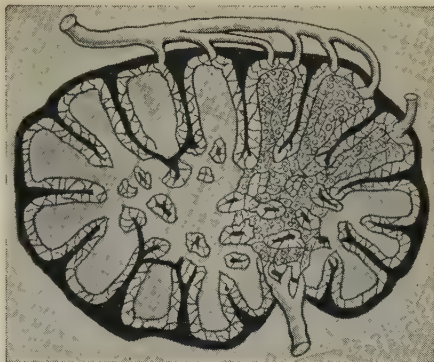
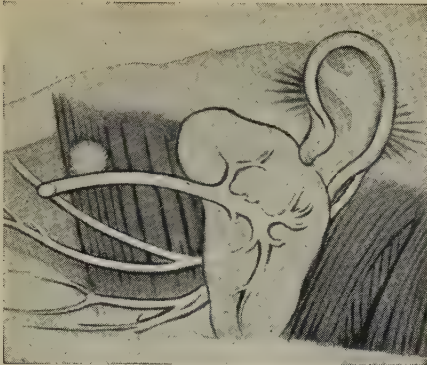
Where the colleges and universities are not supported by the state, rich men have given many millions of dollars for buildings and to pay the salaries of the professors. These wonderful gifts astonish the European, for nowhere else have men of wealth been so liberal. They have also given large sums to establish public libraries, build art galleries and museums, and to found institutions to study scientific and social subjects.

THINGS IN WHICH OUR COUNTRY IS NOT FIRST

As I read over this story I fear that it sounds boastful. Perhaps it is, for I have preferred to tell you of the things in which our country has been most successful. But there are other things in which we are not at the head of the world. In music, art and literature we are not in the first rank. In obedience to the law and respect for the rights of others, many nations surpass us. Our politics are not always clean. We can only hope that as the years go on we shall improve, and every one of us will do his part to make our country a better place in which to live.

Someone has called America the "melting-pot of the world." By this he meant that in our country people of different races, different languages, different religions and different ideas of life are living here together, and out of all the confusion will some day come the future American. Just what he will be like no one can say. He is certain to be unlike the American of the earlier days.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 3397.



The laboratories of the body: a gland beneath the ear, and a gland for making lymph; both in section.

OUR WONDERFUL GLANDS

WE are all familiar now with the word glands, for the swollen glands that sometimes appear in the neck force themselves on our attention. Yet the term is rather hard to define. Let us see, then, exactly what scientific men mean by a gland. Anatomists and physiologists describe as glands many structures which seem to have very little in common.

They call glands the well-known swellings that appear around the face in a case of mumps, and the little lumps that appear on the neck in some cases of tuberculosis. They also call the liver, the spleen, the pancreas, the kidney and the thyroid by the same name. These seem very much unlike one another, yet as science gives them the same name, there must be some likeness common to them all.

The distinguishing feature of a gland is that it forms a special chemical substance of great importance to the general welfare of the body. The whole body, of course, is a chemical laboratory. All the cells composing it—its nerve and skin and muscle and blood-cells—form chemical substances that pass into the blood and no doubt affect cells at a distance.

But most of the cells of the body have other duties and functions, much more important than their chemical



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activities. The chemical substances they form are not very important.

Thus, the chief function of the nerve-cells is to move the muscles, to think or to feel; the chief function of the skin-cells

is to protect the deeper structures; the chief function of the connective-tissue-cells is to form fibres; the chief function of the muscle-cells is to move the limbs or propel the blood; the chief function of the red blood-cells is to carry oxygen.

In the case of the glands, on the other hand, the chemical function is all-important, and the gland is distinguished by the substance it secretes. The salivary glands secrete saliva; the lymphatic glands secrete lymph; the gastric glands secrete gastric juice; the pancreatic gland secretes pancreatic juice; the liver, as we all know, secretes bile; and the sweat glands secrete sweat. All these secretions are of the utmost importance to the whole organism of a human being.

In most cases the gland secretions and their uses were easily found out. Most of the glands have tubes through which the secretion pours, and the secretion reaches the surface and can be seen and examined. The tear glands pour out tears, and we can taste the salt dissolved in the liquid; the milk glands pour out milk, and we can col-

lect and analyze the milk; the salivary and gastric glands pour out digestive juices, and we can put food in them and discover their action.

But other glands are without ducts, and for a long time their functions were a mystery. Among such ductless glands, without any visible secretion, are what are called the thyroid, parathyroid, thymus, suprarenal, pineal and pituitary glands. These are all small, and for a long time their importance was not suspected. In recent years many surprising things have been found out about them, and we now know that they play a great part in the body.

THE LITTLE THYROID GLAND THAT MAKES US WISE OR STUPID

Perhaps the most interesting of them is the *thyroid*, and it was the first to yield up its secrets to science. It is placed across the front of the throat, and when swollen is easily seen. The health of the whole body depends largely on the chemical working of this little gland weighing only about an ounce. If its secretion is too scanty in infancy or childhood, both body and mind fail to develop, and the result is that a human being becomes an idiot. In 1874 there were in France 122,700 idiots due to the failure of this little gland; and in India there are millions. It does not matter how good food a child may be given, it will become a dwarf and an idiot if this gland fails to do its duty.

If the gland fails to do its duty in adult life, the man or woman, however healthy, strong and intelligent, must degenerate and become stupid, fat and sluggish.

It seems strange that a little gland weighing only an ounce should exercise such influence over mind and body. A little more or less of a secretion makes the difference between beauty and deformity, between wisdom and idiocy; but so it is. And when we examine the gland we see that it is made to exercise a potent influence on the body. It is given an extraordinary amount of blood in proportion to its size. Six large arteries bring blood to it, and large veins carry the blood away from it, so that all the blood in the body can pass through it in a very short time.

Happily, medical men have found means of treating the main disorders of the gland. Two Portuguese doctors found that a thyroid gland from a sheep, if

transplanted to the human body, would live and produce enough secretion to cure the disease called *myxedema*. Later on, Dr. George Murray found that an injection of extract from a sheep's thyroid was sufficient, and soon it was discovered that the thyroid extract was curative even when given by mouth. The results of treatment of myxedema by thyroid extract are remarkable. Bodily activity and mental energy are restored as by a miracle.

HOW THE DOCTORS CAN MAKE A FEEBLE MIND STRONG

The form of idiocy called *cretinism* is due to lack of thyroid secretion. It can be treated in the same way by thyroid extract, and the results are equally striking. The idiot grows in mind and body, and becomes fairly healthy and intelligent. One patient, sixteen years old and under thirty inches high, grew six inches in six months.

The thyroid gland may be considered the bellows of the furnace of the body. If it is active, the fires of life burn brightly; and if it is inactive, the fires of life burn low; and there can be no doubt that many cases of laziness and stupidity and neurasthenia are due largely to inactivity of the thyroid. The discovery of the function of the thyroid, and of the cure of certain diseases by thyroid extract, was among the greatest advances medicine ever made. They led to the development of a new method of treatment of disease by extracts of various organs—*organotherapy*, as it is called.

Behind the thyroid are four tiny glands called the *parathyroids*, not discovered till 1880. They are of great importance to the body. It has been found that their removal is followed by contractions of the muscles, and it seems probable that these little glands are partly to blame for convulsions in infants and for other afflictions.

THE MARVELOUS GLAND THAT DOES ITS WORK AND DISAPPEARS

Situated lower in the neck, and partly within the chest, is another little gland about two inches long, called the *thymus*. It attains its greatest size about the end of the second year, and gradually disappears after the fourteenth year. It is now known that this little gland is also of great importance. If it is removed from a young animal the bones do not grow properly: they lack lime, and the growth

of the animal is checked. If this gland does not act sufficiently in childhood the child is dwarfed and becomes flabby, fat and weak; and there is also a tendency to asthma. When the thymus is completely absent, there is often idiocy. When the gland persists too long, the child remains weakly and infantile.

THE LITTLE GLANDS THAT CONTROL THE CIRCULATION OF THE BLOOD

Even more important than the three glands mentioned are what are known as the *suprarenal* glands, which surmount the two kidneys like two little caps. As in the case of the thyroid gland, their importance is indicated by their large blood supply. The suprarenal glands are of vital value to the body, for they throw substances into the blood which are essential to life and vigor. If the glands are removed from an animal, it grows weak and usually dies. If there is not enough of their secretion, there are muscular feebleness, low blood-pressure and nervous troubles; if there be too much secretion, the blood-pressure is greatly raised.

The most important function of these little glands seems to be the control of the circulation, and they are remarkably closely connected with the sympathetic nervous system, and are affected almost instantly by any emotional disturbance. Fear and anger at once stimulate the secretion of the glands, and the secretion, carried by the blood to the liver, liberates sugar there, and throws it into the circulation. Sugar is, of course, a muscle food, and so the muscles have at once a good food supply and are in a position to help either to fight or to run away, as the case may be. At the same time the blood supply of the muscles is increased by the swelling of their blood-vessels, and a contraction of blood-vessels cuts off part of the blood supply from the skin and internal organs.

We see, therefore, that the suprarenal glands are regulators of a wonderful automatic arrangement which prepares an animal for fight or flight by sending a plentiful supply of blood and sugar to the limbs, and by diminishing the risk of bleeding to death in case of wounds. The secretion also causes the heart to beat more quickly and strongly.

WHY A MAN TURNS PALE IN THE FACE OF GREAT DANGER

When a man turns pale in the face of danger, and when his heart palpitates, it

does not necessarily mean that he is afraid. It means that his suprarenal glands have poured secretion into his blood and caused the contraction of the blood-vessels in his skin. And when a man turns pale with rage he is much more dangerous than when he turns red. Pallor under such conditions, indeed, is not a white flag, but a sign of preparedness.

When our hair stands up from fear or horror that also is due to suprarenals. Each hair of the body has a little muscle attached to its base. When the muscle contracts the hair rises up; and it has been proved that these little muscles are stimulated by the suprarenal secretion. When a cat or dog bristles it means that the suprarenals are doing their duty, and no doubt Nature arranged the whole mechanism to make the animal more terrifying to its foes. To mention smaller things, blushing and weeping are also due to the action of the little caps on the kidneys.

It is quite easy to extract the secretion from the gland. It is known in medicine as *adrenalin*, and it is used to cause contraction of little blood-vessels and so stop bleeding; as well as to increase the blood-pressure. Mixed with cocaine, it is often used in painless extraction of teeth.

THE LOST EYE IN THE BRAIN THAT HAS BECOME A GLAND

The *pineal* gland is about the size of an almond and is at the base of the brain. It is not so supremely important as the suprarenals and the thyroid, and perhaps the most interesting thing about it is its history. Some students believe that it is the remains of an eye. In the blind worm it is still found as an eye and may have some seeing power. In man and the higher animals it has no connection whatever with sight. The functions of the gland are rather obscure, but it is known to control growth in some way. It is interesting to know that the great French scientist and philosopher Descartes believed the pineal gland to be the seat of the soul.

Suspended under the base of the brain near the pineal body is the little *pituitary* gland, composed of two different parts. One part is derived from the tissues of the nose and throat, the other from the brain. These two parts have different functions, one influencing blood-pressure, and the other growth.

Extracts of the one part, when injected

into the blood-vessels, cause a marked rise of blood-pressure. The other part has certainly a great deal to do with the growth of the bones. Many of the giants seem to be the result of overactivity of the pituitary gland in early life. The famous Irish giants Cornelius McGrath (8 feet 6 inches) and Charles Byrne (8 feet 2 inches) both suffered from this disease. A Russian giant named Fedor Machnow (9 feet 3 inches) had hands over 14 inches long.

We see, therefore, that this little gland shut inside the brain-case has the power of making giants; but whether we shall ever be able to use its secretion and control the growth of the body is another matter. In 1923 a new ductless gland was discovered, and the discovery is one of the most important and interesting in the history of physiology.

THE GLAND THAT PLAYS AN IMPORTANT PART IN OUR DIGESTIVE SYSTEM

One of the most dangerous and fatal of the diseases afflicting mankind is diabetes. This disease causes the body to lose the power of using up the sugar formed in the process of digestion, so that sugar accumulates in the blood, with many evil consequences.

The disease has always been rather a mystery, but it was known that the pancreas had something to do with it. It occurred in diseased conditions of the pancreas, and also when that gland was removed. The *pancreas* is, of course, a digestive gland, and pours out what is known as the pancreatic juice, which plays an important part in digestion; but it was thought it probably also poured directly into the blood some secretion enabling living cells to use the sugar. With that idea, attempts were made to cure diabetes by injections of extract of healthy pancreas glands. The attempts were all in vain, and it was supposed that the strong digestive juices probably destroyed the other internal secretion.

But in the meantime some observers had noticed that when the pancreatic duct was blocked, all the cells of the pancreas died except certain patches, and so long as these patches were alive, diabetes did not occur. There seemed, therefore, some reason to believe that these patches were really ductless glands, providing the secretion which deals with the sugar. This theory certainly seemed plausible, and at last Dr. Banting and Mr. Best of Toronto

University succeeded in extracting from these patches a substance they called *insulin*, which, when injected into blood, frees the blood of sugar. The discovery is one of the greatest ever made. As thyroid extract relieves the symptoms of other diseases, insulin relieves the symptoms of diabetes. A patient suffering from diabetes may eat starch and sugar without harmful effects if he is given enough insulin to enable his cells to deal with the sugar.

HOW THE GLANDS HAVE GIVEN A NEW TREATMENT TO MEDICINE

The marvelous substances formed by ductless glands, thrown into the blood and playing such important parts in the body, are often called *hormones*. Treatment by hormones is now an important branch of medicine. Extracts of almost every gland are prescribed either singly or together, and many people are ready to believe that they can become young and strong again simply by using the hormones of some young animal. But the matter is not so simple as that. In a few cases where some internal secretion is lacking or deficient it may be possible to replace it or to supplement it by an artificial extract; but the chemistry of the body is very much involved and very complex. The glands do not work singly: they work together, and unless we can tune them in harmony, it may be better to leave them alone.

THE WONDERFUL GLANDS THAT MAY MAKE OR MAR A NATION

What part the ductless glands play in the variation of life we have not yet discovered. The growth and activity of the body and the mind are so dependent on them that it is evident that any little change in them may have far-reaching effects. It is possible, indeed, that many of the differences between races and individuals may depend on minute variations in the activity of the ductless glands. A little more activity of the thyroid gland may make a race restless and energetic. A little development of the pituitary gland may add an inch to the average stature of a nation. Scientists are just at the beginning of their study of these mysterious bodies, but hundreds of students are working to learn more of their effects upon the body. It is possible that the whole science of medicine may be revolutionized by discoveries yet to be made.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 3305.



The Furies, by Sir Edward Burne-Jones.

WHO WERE THE OLD-WORLD GODS?

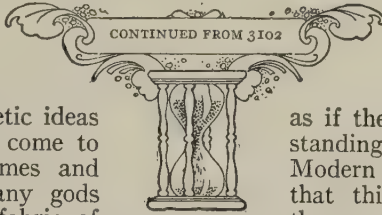
IN reading poetry in any modern language, and less frequently in prose, we are met by the poetic ideas of the Greeks. They come to us chiefly in the names and the doings of the many gods who to us form the fabric of ancient mythology, but to the Greeks were the symbols of religion.

If we do not know the meaning of these names, once held to be divine, we shall miss much that is beautiful in both ancient and modern literatures and art. So here we give a number of the most widely used names of gods. They show us what the men of old thought, and also their struggle to understand life.

The Greek and the Roman mind sought explanations of the world around them through a vivid imagination. Whatever they could not understand they thought to be the work of a god, and accepted their fancies as a religion. The Greeks *dramatized the universe* through their hierarchy of gods.

The Romans did the same when the time came, but presently Greek ideas, and especially Greek art, ruled the Roman mind, and then came a fusion of the mythologies of the two races—the Greeks and the Latins. Greek gods and Roman gods, which had represented similar ideas, were often

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identified as the same. Therefore, we find them frequently spoken of as if they were the same gods standing for the same thing. Modern research has shown us that this is wrong, and that there were often real differences

between Greek and Roman gods whom we regard as pairs.

For instance, the Greek Pallas Athene is generally accepted now as a counterpart of the Roman Minerva, the Greek Zeus as the Roman Jupiter, Artemis as Diana, Hera as Juno, and so through a long list of duplications. Students of mythology, however, will point out differences. As it is desirable that we should have a general knowledge of all these things, however, we here give an outline based on similarities which are more pronounced than differences. The Latin name is given first and the Greek name after it.

Early man, having little exact knowledge to guide him, accounted by a feat of imagination for everything that was mysterious; people love to do it still. In the Greeks this imagination found expression in lovely poetry. They peopled the world with a variety of gods corresponding with all the beautiful and terrible sights of the world, with all the powers and all the processes of nature. No star shone

in the heavens, no cloud veiled the daylight, no wind shook the leaves, but they saw, in imagination, a god presiding over it.

Terra, the Earth, they pictured as the mother of all earthly things, married to Cœlum (Uranus), the sky. Man was born from a bit of earth, saturated with water and warmed to life by the sun's rays, and when he died his venerable mother took him back to her bosom.

So all things were the work of the

gods. That was the spirit in which early man, in the most intellectual of races, interpreted the world and its life. Some gods were near and familiar, some remote and grim. The Greeks conceived of Olympus, their highest mountain, on the boundaries of Macedonia and Thessaly, rising nearly ten thousand feet into the central blue, as the home of the greater gods. There Zeus, afterward identified with Jupiter, had his palace and presided over the gods who formed his court.

THE GODS OF GREECE AND ROME

FROM the reign of Jupiter on Olympus the gods and their qualities are more defined. Jupiter has his palace on Olympus; he has a court and a sceptre. From Olympus he presides over all the gods; to Olympus he summons them. Mount Olympus was chosen as the dwelling-place of the gods because it was the highest of all the Greek peaks, and poets imagined that it touched the sky. The Greeks called the Olympians the twelve principal gods; they were the gods we know best by their Roman names—Jupiter, Neptune, Pluto, Mars, Vulcan, Apollo, Vesta, Juno, Minerva, Diana, Venus, Ceres. The Greek names for these and other gods are given in these pages after the Roman names.

Jupiter (Zeus), son of Saturn and Rhea, was king of gods and men. He dwelt on Olympus, and with a nod could shake the universe. Saved from the cruelty of Saturn by his mother, Jupiter was intrusted to the care of shepherds and fed with goat's milk. When grown up, he dethroned his father; but before he could take his place he had to fight fearful giants, who threw on the gods tremendous rocks. Some of these, falling down into the sea, made the islands; others made the mountains. Jupiter married Juno, and was known as the supreme chief. Thursday (in Latin *Jovis dies*, which has made the French word *jeudi*) was consecrated to Jupiter. The king of the gods is generally represented as a powerful man sitting on a throne; his right hand holds thunderbolts, and his left holds Victory; his sceptre is an eagle.

Juno (Hera) was the queen of heaven. She presided over marriages and births. She is figured as a stately matron bearing a sceptre or a crown; a peacock, called

Argus, is always by her side. In Rome her festival was called the Matronalia.

Saturn (Cronos), meaning Time, son of Terra, married Rhea. Fearing his sons would divest him of his powers, Saturn used to devour them at their birth—a symbol meaning that Time consumes our lives. However, Rhea was able to save Jupiter, Neptune, Pluto and Juno. Saturn, dethroned by his son Jupiter, found a refuge in a part of Italy called Latium, where he became king of mortals and made them so happy that his time, in which freedom and equality prevailed, was called the Golden Age. The Romans celebrated his reign ever after by great festivals, the Saturnalia. Saturn was represented as an old man bent with age, holding a sickle. We also see him figured on buildings with a veil, probably because Time is obscure and covered with an impenetrable veil.

Minerva (Pallas Athene) was the goddess of wisdom, science and art. She is famous for her dispute with Neptune regarding the town of Athens to which at last her name was given. This goddess was a favorite, and Jupiter would grant her anything. All that she promised to mortals infallibly happened. Athens built in her honor the famous Parthenon, for which Phidias carved her statue in gold and ivory. According to the different characters in which she appeared, Minerva held a distaff, a spear, a helmet, or a twig of an olive tree. The owl and the cock are always somewhere by her.

Vesta (Hestia) was the goddess of fire. Her name means "hearth and home." From the remotest times of Asia and Greece her worship consisted chiefly in keeping alight the fire consecrated to her, and in Rome this sacred task was intrusted to virgins called, after her, the

Vestal Virgins. This was so important that whoever let the fire go out had to die, often being buried alive. Vesta was represented clad in a white gown covered with a purple mantle. She held a torch or a lamp.

Apollo, a son of Jupiter, was born in Delos island. Exiled from Olympus, he found a refuge at the court of King Admetus, and roamed the earth for a long time, till Jupiter intrusted him with the care of spreading light over the world. Thus Apollo drove the chariot of the Sun, and enjoyed eternal youth. Apollo is also the god of music, arts, medicine and poetry. On buildings Apollo was generally represented as a beautiful young man with a bow, the arrows symbolizing the rays of the sun.

Diana (Artemis), a daughter of Jupiter, twin sister of Apollo, had several attributes. On earth she was Diana, goddess of the woods and the hunt; in the sky she was Phœbe (Selene), goddess of the Moon; in the lower regions she was Hecate. Maidens, especially, prayed to her. Diana's most famous temple was at Ephesus, but the Diana of Ephesus was really a distinct deity of Asiatic origin. Diana was generally shown barefooted, in hunting dress, with a quiver on her shoulder, or a crescent on her brow, a symbol of the Moon.

Ceres (Demeter) taught men to till the soil, to sow, to reap and to bake. In Greece her most famous temple was that of Eleusis, where mysteries were regularly performed to the glory of the goddess. We most often see Ceres represented as a running traveler. She is looking for her daughter Proserpina, in searching for whom she spent most of her life. Ceres is also figured as a comfortable matron adorned with a wreath of corn, a symbol of fruitfulness.

Vulcan (Hephæstus), a son of Jupiter and Juno, was ugly, misshapen and lame, but the most industrious of all the gods. He used to do all sorts of works. He made jewels for the goddesses, thunderbolts for Jove, weapons for Achilles. Vulcan was the god of iron, brass, gold and silver. In his statues Vulcan, the father of the blacksmiths, holds a hammer in the right hand and pincers in the left. Poets set his dwelling in an island covered with rocks, from the top of which flames and smoke used to run down. This idea has given us the word volcano.

Mercury (Hermes), son of Jupiter, was the messenger of the gods, of travelers, of merchants, and even of rogues. A splendid talker, aware of everything, present everywhere, always ready to help, he played a very important part in Olympus and on the earth. In his statues his hat and feet are adorned with two little wings to prove his swiftness; he holds a purse as the emblem of commerce, or his famous rod entwined with snakes as the emblem of his magic power. Wednesday (in Latin *Mercurii dies*, which has given the French *mercredi*) was consecrated by the ancients to Mercury.

Mars (Ares) was the god of war. Though not invincible, Mars was always accompanied by Victory. On ancient buildings he is represented under the somewhat uniform features of a strong man armed with a helmet, a pike and a buckler. Tuesday (in French *mardi*, from the Latin *Martis dies*) was consecrated to him.

Venus (Aphrodite) used to preside over the pleasures of love, her son (Cupid, or Eros) over marriages and births, and especially over love affairs. Venus was renowned for the prize she was awarded by Paris for beauty, against Juno and Minerva. Venus is beautiful, young and smiling. Sometimes her foot rests on a shell, sometimes she sits in a chariot drawn by two swans. Many sculptors have tried to make statues of Venus. The best known is the famous Venus discovered at Melos in 1820, now perhaps the great single treasure of the Louvre in Paris. Friday (in French *vendredi*, from the Latin *Veneris dies*) was her day.

Bacchus (Dionysus), son of Jupiter, taught men to plant the vine, and was deified. This god's usual train was very important. Silenus, his companion and tutor, first attended him; then followed nymphs, the Bacchantes, satyrs and shepherds. Great revels, the Bacchanals, were held in his honor. Bacchus is generally represented riding on a barrel, crowned with garlands of vine, or with two horns, the emblem of power.

Themis was the goddess of equity, law and peace. In Olympus she sat by Jupiter and helped the god as a counselor of justice. Her chief attributes in sculpture and pictures are scales and a sword. We also see her blindfolded, to

designate her impartiality in the character of a judge.

Cupid (Eros), son of Venus, was the god of love, or rather Love itself. As soon as Cupid was born Jupiter, guessing all the troubles he would cause, wished his mother to get rid of him. But Venus hid the child in the woods, where she fed him on goat's milk. There he made his famous arrow and first tried it on animals before he could use it on men. Cupid is generally represented as a winged child six or seven years old. Armed with a bow and a quiver full of sharp arrows, he goes about among gods and men. His violent passion for Psyche, whose beauty roused the envy of his mother, ended by his marrying her. His worship is associated with that of his mother Venus.

Iris was the messenger of the goddesses, but especially Juno's, as she had to help Juno in her duties. Iris is usually pictured in art as a graceful maiden with shining wings. Poets pretended that the rainbow was the trail of the feet of Iris as she ascended from Olympus with a message.

Hebe (Juventas), cupbearer of the gods on Olympus. She is represented crowned with flowers, and with a cup in her hand. The name of Hebe is joined to that of Ganymede, who took her place when she married.

Hercules (Heracles) was the son of Jupiter and a mortal. Juno hated him and he was forced to perform twelve tasks supposed to be impossible. When the mortal part of him died he was translated to Olympus and given Hebe as his wife.

The Graces (Charities) were three in number: Aglaia, Thalia and Euphrosyne.

They were the embodiment of grace and beauty, and their power extended over all humans. They bestowed on men gaiety, grace, humor and good manners.

The Muses, nine sisters, were each the symbol of an art: Clio, the muse of history, reads in a book. Euterpe, the muse of lyric poetry, invented the flute and is pictured playing it. Thalia presided over comedies; she holds a mask and looks bright and playful. Melpomene, tragedy, has a grave attitude and carries a sword. Terpsichore, dance, is a fair maiden, young and lively. Erato, the muse of love lyrics, is a fine, merry girl crowned with roses. Polyhymnia, the muse of the sublime hymn, appears in thoughtful mood. Urania, astronomy, wears a starred gown and bears a globe. Calliope, the muse of epic poetry and eloquence, is represented as a stately young woman.

The Hours meant to the Greeks not the divisions of the day, but those of the year. They were the goddesses of the seasons. They were responsible for the opening and closing of the doors of Olympus, for the education of children, and for the general rules of human lives. That is why they always attend marriages, as we see in pictures.

The Fates (Moiræ) were three sisters: Clotho, Lachesis and Atropos. Immutable in their devices, they held a mysterious thread meaning the course of life, and nothing could prevent them from cutting it when the hour of fate had struck. Clotho, sitting, holds the distaff and spins the thread. Lachesis rolls up the thread on the spindle. Atropos mercilessly cuts the thread which is supposed to measure the life of each and every mortal.

THE LESSER GODS

TO the ancients, wherever there was life there were gods. Thus the Greeks peopled the heavens with divinities. Though not so powerful as the main gods, these divinities played a part of their own, as, for instance, that of guiding the clouds, helping the winds to rise, and so on. Intrusted with special missions, these gods were the attendants of the great Olympian powers and the confidants of mortals.

Prometheus deceived Jupiter and stole a spark of fire out of Olympus to give it

to men. But the king of the gods revenged himself cruelly by chaining up Prometheus on the Caucasus and condemning him to be the everlasting prey of a vulture which devoured his liver. However, men were henceforth in possession of fire, the symbol of intellect and knowledge that Jupiter did not mean to grant them. Prometheus was finally rescued from his sufferings by Hercules.

Aurora (Eos), goddess of the dawn, announced the advent of the chariot of the Sun. The ancients represented her

PICTURES OF OLD-WORLD MYTHS



THE THREE FATES SPINNING THE THREAD OF LIFE, BY J. M. STRUDWICK



PSYCHE, BY ALFRED DE CURZON



PSYCHE'S GARDEN, BY J. W. WATERHOUSE

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APOLLO. FROM THE PAINTING BY BRITON RIVIERE



IN THE ARMS OF MORPHEUS. FROM THE PAINTING BY W. REYNOLDS-STEPHENS



THE MIRROR OF VENUS. FROM THE PAINTING BY SIR EDWARD BURNE-JONES



APOLLO AND DAPHNE. FROM THE PAINTING BY HENRIETTA RAE



VENUS AND ANCHISES. FROM THE PAINTING BY SIR W. B. RICHMOND



CIRCE. FROM THE PAINTING BY SIR EDWARD BURNE-JONES

clad in a pale yellow dress, holding a torch as if to herald the Day. Some poets figure her riding the famous winged horse Pegasus, or chasing Night and Sleep.

Hyperion, a son of Cœlum and Terra, was the father of the Sun, but the poets often give his name to the Sun itself.

Sol (Helios), the Sun, had great altars in the ancient world. The Egyptians even consecrated to him a whole city, Heliopolis. It was by the name of the Sun that people used to swear faithfulness to their engagements. Helios is now pictured driving his chariot with the horses breathing fire, or as a fair young man crowned with sunbeams.

Phaeton was a son of Helios. Having once deserved a reward, Phaeton asked to be intrusted with the driving of the Sun's chariot for one day. The horses of Helios soon marked the change. They wandered out of the right path, and the sky was threatened with a conflagration, and the earth dried up to its very core. Phaeton was cast down by the gods into the river Eridanus.

The Stars. A sacred origin was ascribed to the luminous bodies in the firmament. Their principal part was to hear the prayers of mortals in all the difficult circumstances of life. Because of their vicinity to Olympus the astral bodies were supposed to support any request addressed to the gods.

Lucifer (Phosphoros) is the planet Venus, the Light-bringer, when seen before sunrise as the Morning Star. She was the daughter of Jupiter and Aurora, and the leader of all the other stars. She was represented driving white horses through the sky to herald Dawn, or Aurora.

Vesper (Hesperos) is Venus as the Evening Star. Italy and Spain, both lands situated in the west, where the Sun sets, were called Hesperia, or the Western Land.

The Heliades, daughters of Helios, are known for their affliction at the death of their brother Phaeton. They wept for months and months, till the gods changed them into poplars.

Luna (Selene), the Moon, was the greatest divinity of the heavens next to the Sun. Selene was identified in later times with Aphrodite. To Pindar she was the eye of Night. To Horace she was the queen of silence. Monday (in

French *lundi*, from the Latin *Lunæ dies*) was her day.

The Hyades (the Rainers) were the sisters of Hyas, and their great inclination for hunting was fatal to him. They wept so bitterly over his death that Jupiter, touched by their grief, changed them into stars. When they rose with the Sun they were to the Greeks a sign of approaching rain.

The Pleiades were the seven daughters of Atlas who were changed into stars because their father had tried to read the secrets of the gods. They were called Pleiades after a Greek name meaning "to navigate," because they appeared in May, a month favorable to sailors.

Orion was a famous giant and son of Neptune, a clever hunter whose death was brought about by the jealousy of Diana. But after he had died she so regretted her anger that she claimed from Jupiter a special place in the heavens for Orion.

Sirius, or the dog star, is called after Orion's faithful hound Sirius. The Greeks feared him and offered him great human sacrifices. The name means "scorching," and Sirius marks the season of the greatest heat. In English we speak of the "dog days."

Callisto, an Arcadian king's daughter, was loved by Jupiter and was changed into a bear by jealous Juno. Arcas, her son, was hunting once in the woods and met the bear, and was preparing to shoot it. Jupiter, to prevent the tragedy, put an end to both their lives, and awarded them a place in heaven under the names of Great and Lesser Bear.

Pandora was the first woman. Jupiter made her out of clay, endowed her with most beautiful gifts, and gave her a box which she was to present to the man she married. Accompanied to earth by Mercury, Pandora appeared to Prometheus; but he refused to open the fatal box, which she took to Epimetheus. Pandora has remained the image of temptation. She was to the Greeks as Eve is to us.

Epimetheus, brother of Prometheus, married Pandora to obtain possession of her box, but his curiosity was punished, for the box was full of evils, which spread over the earth. Only Hope remained at the bottom of the box. That is why men still may be cheered by Hope.

The Winds were poetic divinities, children of Sky and Earth. Their king,

Eolus, held them back in deep abysses, and the terrible prisoners roared behind the gates of their caverns till *Jupiter* decided to let them loose. The ancient poets had a different myth for each of the four winds:

1. *Eurus*, a wind blowing from the southeast, was represented as a flying youth, violent and disorderly.

2. *Boreas* was a north wind, generally shown as a white-haired old man.

3. *Notus* (*Auster*) was a hot and stormy wind blowing from the south. We

see him pictured holding a watering-can, emblem of the rain the south wind brings.

4. *Zephyrus* was the gentle west or northwest wind. The Greeks loved it because it brought freshness over their parched land. Poets fancied *Zephyrus* as a sweet and serene young man with butterfly wings. Our word *zephyr*, meaning a gentle breeze, comes from his name.

Tempesta had her temples in Greece and in Rome. We find her pictured on ancient monuments with an angry face and threatening aspect.

GODS OF HOME AND FATHERLAND

Manes was the name given to the spirits of the dead. The ancients believed that the *Manes* presided over the cemeteries.

Mnemosyne was called the goddess of memory, this Greek word meaning "memory." Poets made her the mother of the nine *Muses*, because to memory mankind owes the progress of science.

Mithras was a king of Persia, adored as a god of the Sun. His worship was introduced into Rome and continued until Christian times. *Mithras* was generally represented as a youth with a turban on his head knocking a bull down to show his power.

Eris was called *Discordia* by the Romans. A sister of *Ares*, she was a dangerous deity, spreading discord in Olympus as well as on earth. Everyone feared her, so that *Jupiter* ended by driving her away from Heaven. The painters represent her as a ghastly woman shabbily clad and holding a dagger. Her head is often entwined with serpents, and her usual attendant is *Bellona*.

Nike was the Greek goddess of victory. She was a daughter of *Pallas* and *Styx*, and is often shown as a winged figure carrying a palm or a wreath, guiding the horses of victors in battle, or writing their names on a shield.

Lares and *Penates* were the gods of the hearth whose worship was in great honor among the ancients. *Lares* were spirits of dead ancestors, and it was thought they could still play a part in domestic affairs. They were represented in small statues so that they could be easily taken about when the family moved. Our cherished family treasures are often termed "*lares*."

Genius (*Dæmon*), the patron saint of

every man, presided over births. Everybody had his own and sacrificed to him on his birthday. Some were good *genii*, some bad. The good genius was represented as a fair young man crowned with flowers; the bad genius as an ugly old man holding an owl, the bird of ill omen or of woe.

Fortuna, the daughter of Night and Chaos, was blind, the leader of all the gods and of all humans, with whose fate she dealt through her three ministers, the *Parcæ*. Only the Oracles could foresee and reveal what was written in the inexorable book of Fate. *Fortuna* is represented with a horn of plenty, meaning that she is the sovereign of riches; or with a sceptre as emblem of her power; or holding a wheel as symbol of her fickleness and instability.

Æsculapius, son of *Apollo* and a mortal, was a prince known for his cleverness in the art of curing sickness. He even once succeeded in bringing the dead to life, but *Jupiter*, angry with jealousy, struck him dead. Legend has made him the father of physicians. In statues he is represented sitting on a throne, one hand leaning on a serpent's head, suggesting his power over evil.

Hygeia, the goddess of health, was the daughter of *Æsculapius*. The ancients represented her as a veiled figure to whom the matrons consecrated their locks. Our word *hygiene* is connected with her name.

Hymen, the god of marriage, was pictured among the ancients as a handsome youth crowned with flowers, holding a torch in one hand, and in the other a yellow veil destined to cover his bride.

Morpheus was the son of *Somnus* and

the god of dreams. The artists made him a sleeping child surrounded with poppies, his favorite flowers, because poppies induce dreams.

Somnus (Hypnos) was the god of sleep. This word gives us the French word *sommeil*, for sleep, and the English word *somnambulism*.

GODS OF COUNTRY AND TOWN

Vertumnus, the god of the gardens and orchards in Rome, married Pomona, the goddess of the fruit trees. The earliest garden produce was offered to him. This happy couple used to grow old and young again every year and never died, suggesting the regular rounds of the seasons.

Flora was the goddess of flowers among the Romans. She married the wind Zephyrus in May, and both held a high rank in the train of Spring.

Pomona, a beautiful nymph, presided over the gardens in Rome. She was most often pictured sitting on a basket of flowers and fruits, or holding a horn of plenty.

Pales was the goddess of Roman shepherds. Her festival, the Palilia, came each year on the day of the foundation of Rome by Romulus.

Terminus was a Roman deity who presided over frontiers and boundaries, and revenged any usurpation of land. He was at first represented under the shape of a big square stone, but afterward artists gave him a human head placed on a milestone.

Janus was supposed to be the first king to reign over Italy. Having once offered hospitality to Jupiter, he was endowed with the gift of knowing the past and the future. As the guardian of gates he was represented by artists as having two faces, looking both ways. As the Romans made a great warrior of Janus, his temple was opened only in war-time. It is interesting to note that this famous temple was closed only three times during the whole of Roman history. January is called after Janus, as it was the first month in the later Roman calendar.

GODS OF THE WATERS

Oceanus. To the ancients the ocean was a huge river surrounding the earth. Oceanus, the son of Uranus and Terra, is the chief god of all waters. Being as old as the world, Oceanus was represented as an aged man sitting on the sea and pouring out water.

Tethys, daughter of Uranus and Terra, married her brother Oceanus, and gave birth to three thousand nymphs, the Oceanids. Tethys is generally seen driving a seashell, her chariot, followed by a train of dolphins, tritons and Oceanids.

Nereids. Nereus, son of Oceanus and Terra, had fifty daughters, the Nereids. He is represented as a gentle and peaceful old man, full of justice and kindness; and the Nereids as beautiful girls riding dolphins, their hair adorned with pearls. The Nereids were the nymphs of the Mediterranean, as the Naiads were the nymphs of the fresh water, and the Oceanids the nymphs of the ocean.

Neptune (Poseidon), a son of Saturn and Rhea, was a brother of Jupiter and Pluto. When the three brothers divided the wealth of Saturn, Jupiter took the earth, Pluto took the lower regions, and

Neptune was given the sea. Neptune rode in his chariot over the sea drawn by horses. Statues generally represent the god of waters with a long beard, holding his special attribute, the trident.

Amphitrite, wife of Neptune, mother of Triton, is pictured driving a shell on the sea with the Nereids as her attendants.

Triton, son of Neptune and Amphitrite, was a demigod—half man, half fish. He played the part of the herald of Neptune.

Proteus, a sea god, was the shepherd of Neptune, whose flocks embraced seals, sea-lions and all sorts of big fishes. As a reward for his services Proteus had received from Neptune the gift of prophecy. The famous shepherd could assume different shapes and disappear at will. The name of Proteus is often used to describe somebody quick at moving from one place to another, or quick at changing faces. The adjective "protean" comes from his name.

Glaucus, a sea god, gifted with a special power of prophecy, was Neptune's soothsayer, or foreteller of events. His

statues resemble Triton's, except that his beard is white and dripping, his arms are fins, and his chest is covered with seaweed.

The **Harpies** were monsters with the faces of old women and the bodies of vultures. They caused famine wherever they passed, and emitted a fearful odor. Drive them away as you could, they would always come back. Jupiter and Juno used them against those they wished to punish.

Circe was a daughter of the Sun. She was supposed to be clever enough to make the stars come down from heaven. Sea travelers could hardly escape from her charms. The fable of Circe changing men into brutes has remained as popular as that of Ulysses.

Charybdis, a daughter of Neptune, having stolen a part of the flock of Hercules, was stricken down by Jupiter and changed into a dangerous whirlpool in the Strait of Sicily.

Scylla, a beautiful nymph, had been changed into a monster by jealous Circe. Terrified by her ugliness, she threw herself into the sea and became a rough rock which has since been called after her, between Italy and Sicily. Scylla and Charybdis were both deemed by the ancients as most dangerous to navigators. We say of a man coming upon two dangers together and not knowing which to flee from, that he is "between Scylla and Charybdis."

The **Sirens** were three sea nymphs to whom the Oracles had predicted life as long as they could detain navigators on their way. So they did for a long time. But subtle Ulysses stopped his ears and those of his sailors with wax so that they were not tantalized by the enticing voices. The terrible nymphs died and were changed into islands. All the writers and artists have represented the Sirens as fish-tailed maidens, or half bird and half woman.

The **Gorgons**, three famous sisters

called Stheno, Euryale and Medusa, lived a long way over the ocean, at the end of earth. Medusa, their queen, who offended Athene, had her hair changed into snakes, and her eyes were given the fatal power of turning into stone every human they looked upon. The Gorgons are represented with enormous heads interwoven with snakes. The best head of Medusa is a masterpiece by Leonardo da Vinci in one of the galleries of Florence.

The **Cyclops**, three monstrous giants, sons of Neptune, were so ugly with their single eye that Jupiter cast them down into the lower regions. Vulcan adopted them as the chief workers of his forge. The most famous Cyclops was Polyphemus.

The **Rivers** were personified as sacred children of Oceanus and Tethys; they numbered three thousand, and the ancients would never cross a stream without having uttered a prayer.

The **Naiads** presided over rivers and fountains. Pictures show them as young nymphs with naked legs and arms, crowned with aquatic plants.

Arethusa. Alpheus, an intrepid hunter, met Arethusa in the woods and fell passionately in love with her. But Arethusa implored Diana's help, and the goddess changed Arethusa into a spring and Alpheus into a river.

Ladon was a Greek river famous for the encounter on its banks of Syrinx and of Pan. The nymph, fearing the love of Pan, was changed into reeds, which have continued to grow along rivers ever since. From these reeds Pan made his flute with seven pipes.

The **Fountains** were the daughters of Oceanus and Tethys, for whom great rituals were held in Greece. Inspirers of the Muses, the best-known fountains were: Aganippe, Hippocrene, Castalia and Pyrene. The Fountain of Youth has also remained famous for its power of giving back youth. Ponce de Leon sought for it.

GODS OF MOUNTAINS AND WOODS

THE Mountains were regarded by the ancients as genii, each representing a special production of the land.

The **Fauns** (Satyrs), scattered about in the country, chiefly waited upon Bacchus. Poets make them the terror of shepherd and nymphs.

Daphnis was a shepherd of Sicily whom the Muses had gifted with the love of poetry. He was translated to heaven by his father Hermes.

Aristæus, a son of Apollo, was brought up by the nymphs, who taught him to grow olives and keep bees.

Priapus represented the fruitfulness of nature. The Greeks worshiped him as the god of gardens. He was generally represented half length, with a ram's horns and a leafy wreath, or else holding some fruits.

Marsyas was a satyr who disputed with Pan the invention of the flute. He was known as a great musician, the first who wrote music down. Apollo was jealous and put him to a terrible death. The unfortunate Marsyas was generally represented as tied to a tree ready to be flayed, or as a satyr playing a pipe.

Pan was the god of all shepherds and flocks. He was represented as an ugly satyr with the body of a goat, with horns, and untidy hair and beard. He often carries a flute, his supposed invention. Pan generally terrified those he approached, and the word "panic" has come from his name.

Echo was one of Juno's attendants. She fell in love with Narcissus, but, when disdained by him, retired to a cavern and died, though her voice remained in the rock. That is how the Greeks explained the echo.

Narcissus was a beautiful youth who caught sight of his image in a river and fell in love with it. He remained so long admiring his face in the waters that he took root and turned into a flower—called after him.

The Hamadryads were nymphs whose lives depended on the lives of certain trees, with which they were supposed to live and die. Homer shows them escaping from trees.

The Dryads were nymphs that presided over the trees. They were represented as women with roots for the lower part of their bodies, and shoulders covered with hair. They wore oak leaves for crowns.

The Woods were the first places where

men gathered to worship their gods. It seemed to them that in the shade of woods the gods would more easily and more freely come down to earth. The most venerated forests were: Epidauria, consecrated to Æsculapius, the father of medicine; Nemea, where Hercules was feasted; Dodona, where the oaks were supposed to foretell events.

The Volcanoes, especially Mount Etna, in Sicilia, were supposed to be the forges of Vulcan, and to communicate with the lower world. The ancients made use of volcanoes to predict the future. They threw precious things, even human victims, into the craters. The word volcano comes from Vulcan.

The Hesperides, also called Atlantides, were daughters of Atlas, and the owners of a famous garden. The garden of the Hesperides held golden fruits, and was guarded by a dragon with a hundred heads and several voices. It was among the twelve works of Hercules to kill this dragon and carry off the golden apples.

Atlas, one of the Titans conquered by Jupiter, was changed into a mountain and condemned to support the vault of heaven on his shoulders. The Greeks imagined this fable because of the great height of Mount Atlas in Africa. Its peak was supposed to touch the heavens. Atlas is still represented as a giant standing on the ocean and supporting a globe on his shoulders.

Mount Helicon was one of the favorite dwelling-places of the Muses. Helicon is also famous for the river Hippocrene, which flowed from its summit; for the tomb of Orpheus; and for a sacred wood where rites were celebrated to the glory of Apollo.

Parnassus, one of the highest mountains of the ancient world, had two famous summits—one consecrated to Apollo and the Muses, the other to Dionysus.

THE LOWER WORLD

THE Infernal Regions were underground places sheltering the dead. They embraced four different regions: Erebus, Hell, Tartarus and Elysium.

Tartarus was the palace of the gods of the lower world and their train. It spread a long way inside the earth, and was surrounded by a triple wall of brass. No dead mortal ever penetrated into Tartarus.

Elysium was the residence of virtuous souls after death. Some of the ancients placed Elysium in an African island, some in Italy. The name Champs Elysées in Paris means "Elysian Fields."

Hell was the terrible place of all punishments and tortures, a land of fire supposed to be surrounded with fearful marshes and brazen rivers which left no hope of escape to the dead.

Erebus was the underground place nearest to earth, the way to Hell or Elysium. The ancients believed that the shadows of the unfortunate who had not been buried would wander for a hundred years in Erebus before they knew where to settle.

Styx was a famous river winding round Hell in circles. Its waters were supposed to run with mud through darkest lands. The gods always swore by the Styx.

Acheron was a river like the Styx. It was represented as a very old man clad in damp cloth, with an owl generally standing by.

Cocytus, an infernal river, ran into the Acheron. Its stream was supposed to be made of the tears of the wicked. It was the river of lamentations.

Pluto was the third son of Saturn and Rhea, to whom the lower regions had been given when Jupiter was given Heaven and Neptune the Ocean. Pluto dwelt in Tartarus. Because of his ugliness he could never find a willing wife, and had to carry off Proserpina whom he made queen. His attribute is the cypress, the dark foliage of which expresses melancholy and grief.

Proserpina was a beautiful maid whom Pluto carried away to make his queen. The ancients believed that nobody could die had not Proserpina herself cut the threads of their lives with the aid of Atropos.

Charon, a son of Erebus and Nox, conveyed the shades of the dead over the Styx and the Acheron. Charon was old and mean, and those who had no money could not enter the boat. This is why the ancients never failed to put a coin in the mouths of their dead. Those who had not been buried were not entitled to the crossing, and the legend supposed them wandering for a hundred years on the river bank. Charon is pictured in sombre garb, sullied by the black slime of the foul waters. He stands in his boat and plies the oars.

Cerberus, Pluto's three-headed dog, was the keeper of the gate of Hell. His part was to prevent the dead from getting out of their prison, and to prevent the over-curious from entering it before they died. On ancient medals Cerberus always stands by Pluto, but on buildings he is generally chained up by the side of Hercules, who dragged him from the lower worlds.

Rhadamanthus was one of the three judges, with Æacus and Minos, before whom the dead had to appear after they were buried. Their tribunal was called the Field of Truth, because neither lie nor slander could approach it. Rhadamanthus was represented on a throne holding a sceptre.

Æacus was one of the three judges of the dead, with Rhadamanthus and Minos. Æacus was the father of Peleus and the grandfather of the famous Achilles.

Minos, brother of Rhadamanthus, was one of the three judges of the dead. We most often see him sitting among the shadows of the dead.

Nemesis is often mistaken for the Furies. Nemesis should be called the goddess of compensation. Her part was to deal as equally as possible with happiness and misfortune over mankind. Had a man been very happy so far, Nemesis was to send him his share of trials to balance the good, or vice versa.

Thanatos, or Death, was the implacable enemy of mankind. He dwelt in Tartarus. Thanatos was supposed to have a heart of iron and bowels of brass. Some sculptors close his eyes, veil his head, and give him a sickle, the attribute of death.

Lethe. After the dead had remained a certain time either in Elysium or Hell, they were entitled to reincarnation in another body on earth. But before they left the lower regions they had to drink water of the river Lethe, which would wipe out all memories of their former life. Our words "lethal" and "lethargy" come from Lethe, which means the "sleep of forgetfulness."

The Furies were the ministers of the vengeance of the gods on mankind. There were three principal Furies—Alecto, Tisiphone and Megara.

These names of gods and goddesses, and of other creatures of the vivid imagination of man in the classical lands, are far from exhausting the personnel of the old mythologies. They are almost as numerous as the ideas of mankind. Anything that was striking and mysterious was personified as a god, and their varying attributes became the framework of ancient poetry. A knowledge of mythology is a key that unlocks for us an understanding of the world in its brilliant youth.

THE NEXT WONDER QUESTIONS ARE ON PAGE 3353.

IF we have never read *Sentimental Tommy*, we shall certainly want to when we have finished this chapter. Tommy and Elspeth, his little sister, were left orphaned in London by the death of their mother, a "Thrums" woman. To their help came Aaron Latta, a weaver who had loved Jean Myles in earlier, happier days. He took the bairns back to live with him in his cottage at Thrums. There Elspeth kept house, and the two got on finely, but Tommy and the weaver could find no common ground. The boy was clever, a leader in the village, full of spirit and inspiration, but very much disinclined toward serious study. If he did not gain a bursarship for college, Tommy knew that he must go to the "herding." Though he hated the prospect, he seemed unable to control his wayward thoughts.

THE BRANDING OF TOMMY

GRIZEL'S secession had at least one good effect: it gave Tommy more time in which to make a scholar of himself. Would you like a picture of Tommy trying to make a scholar of himself?



They all helped him in their different ways: Grizel, by declining his company; Corp, by being far away at Look-about-you, adding to the inches of a farmhouse; Aaron Latta, by saying nothing but looking "college or the herding;" Mr. McLean, who had settled down with Ailie at the Dovecot, by inquiries about his progress; Elspeth by—but did Elspeth's talks with him about how they should live in Aberdeen and afterward (when they were in the big house) do more than send his mind a-galloping (she holding on behind) along roads that lead not to Aberdeen? What drove Tommy oftenest to the weary drudgery was, perhaps, the alarm that came over him when he seemed of a sudden to hear names of the bursars proclaimed and no Thomas Sandys among them. Then did he shudder, for well he knew that Aaron would keep his threat, and he hastily covered the round table with books and sat for hours sorrowfully pecking at them, every little while to discover that his mind had soared to other things, when he hauled it back, as one draws in a reluctant kite. On these occasions Aaron seldom troubled him, except by glances that, neverthe-

less, brought the kite back more quickly than if they had been words of warning. If Elspeth was present, the warper might sit moodily by the fire, but when the man and the boy were left together, one or other of them soon retired, as if this was the only way of preserving the peace. Though determined to keep his word to Jean Myles liberally, Aaron had never liked Tommy, and Tommy's avoidance of him is easily accounted for; he knew that Aaron did not admire him, and unless you admired Tommy he was always a boor in your presence, shy and self-distrustful. Especially was this so if you were a lady (how amazingly he got on in after years with some of you, what agony others endured till he went away!), and it is the chief reason why there are such contradictory accounts of him to-day.

Sometimes Mr. Cathro had hopes of him other than those that could only be revealed in a shameful whisper with the door shut. "Not so bad," he might say to Mr. McLean; "if he keeps it up we may squeeze him through yet, without trusting to—to what I was fool enough to mention to you. The mathematics are his weak point, there's nothing practical about him (except when it's needed to carry out his devil's designs) and he cares not a doit about the line A B, nor what it's doing in the circle K, but there's whiles he surprises me when we're at Homer. He

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has the spirit o't, man, even when he bogles at the sense."

But the next time Ivie called for a report—!

In his great days, so glittering, so brief (the days of the penny Life), Tommy, looking back to this year, was sure that he had never really tried to work. But he had. He did his very best, doggedly, wearily sitting at the round table till Elspeth feared that he was killing himself and gave him a melancholy comfort by saying so. An hour afterwards he might discover that he had been far away from his books, looking on at his affecting death and counting the mourners at the funeral.

Had he thought that Grizel's discovery was making her unhappy he would have melted at once, but never did she look so proud as when she scornfully passed him by, and he wagged his head complacently over her coming chagrin when she heard that he had carried the highest bursary. Then she would know what she had flung away. This should have helped him to another struggle with his lexicon, but it only provided a breeze for the kite, which flew so strong that he had to let go the string.

Aaron and the Dominie met one day in the square, and to Aaron's surprise Mr. Cathro's despondency about Tommy was more pronounced than before. "I wonder at that," the warper said, "for I assure you he has been harder at it than ever the last nights. What's more, he used to look doleful as he sat at his table, but I notice now that he's as sweet to leave off as he's keen to begin, and the face of him is a' eagerness too, and he reads over to himself what he has wrote and wags his head at it as if he thought it grand."

"Say you so?" asked Cathro, suspiciously; "does he leave what he writes lying about, Aaron?"

"No, but he takes it to you, does he no?"

"Not him," said the Dominie, emphatically. "I may be mistaken, Aaron, but I'm doubting the young whelp is at his tricks again."

The Dominie was right, and before many days passed he discovered what was Tommy's new and delicious occupation.

For years Mr. Cathro had been in the habit of writing letters for such of

the populace as could not guide a pen, and though he often told them not to come deaving him he liked the job, unexpected presents of a hen or a ham occasionally arriving as his reward, while the personal matters thus confided to him, as if he were a safe for the banking of private histories, gave him and his wife gossip for winter nights. Of late the number of his clients had decreased without his noticing it, so confident was he that they could not get on without him, but he received a shock at last from Andrew Dickie, who came one Saturday night with paper, envelope, a Queen's head, and a request for a letter for Bell Birse, now of Tilliedrum.

"You want me to speir in your name whether she'll have you, do you?" asked Cathro, with a flourish of his pen.

"It's no just so simple as that," said Andrew, and then he seemed to be rather at a loss to say what it was. "I dinna ken," he continued presently with a grave face, "whether you've noticed that I'm a gey queer deevil? Losh, I think I'm the queerest deevil I ken."

"We are all that," the Dominie assured him. "But what do you want me to write?"

"Well, it's like this," said Andrew, "I'm willing to marry her if she's agreeable, but I want to make sure that she'll take me afore I speir her. I'm a proud man, Dominie."

"You're a sly one!"

"Am I no!" said Andrew, well pleased. "Well, could you put the letter in that wy?"

"I wouldna," replied Mr. Cathro, "though I could, and I couldna though I would. It would defy the face of clay to do it, you canny lover."

Now, the Dominie had frequently declined to write as he was bidden, and had suggested alterations which were invariably accepted, but to his astonishment Andrew would not give in. "I'll be stepping, then," he said coolly, "for if you hinna the knack o't I ken somebody that has."

"Who?" demanded the irate Dominie.

"I promised not to tell you," replied Andrew, and away he went. Mr. Cathro expected him to return presently in humbler mood, but was disappointed, and a week or two afterwards he heard Andrew and Mary Jane Proctor cried in the parish church. "Did Bell Birse re-

fuse him?" he asked the kirk officer, and was informed that Bell had never got a chance. "His letter was so cunning," said John, "that without speiring her, it drew ane frae her in which she let out that she was centred on Davit Allardyce."

"But who wrote Andrew's letter?" asked Mr. Cathro, sharply.

"I thought it had been yoursel'," said John, and the Dominie chafed, and lost much of the afternoon service by going over in his mind the names of possible rivals. He never thought of Tommy.

Then a week or two later fell a heavier blow. At least twice a year the Dominie had written for Meggy Duff to her daughter in Ireland a long letter founded on this suggestion, "Dear Kaytherine, if you dinna send ten shillings immediately your puir auld mother will have neither house nor hame. I'm crying to you for't, Kaytherine; hearken and you'll hear my cry across the cauldrieff sea." He met Meggy in the Banker's Close one day, and asked her pleasantly if the time was not drawing nigh for another appeal.

"I have wrote," replied the old woman, giving her pocket a boastful smack, which she thus explained, "And it was the whole ten shillings this time, and you never got more for me than five."

"Who wrote the letter for you?" he asked, lowering.

She, too, it seemed, had promised not to tell.

"Did you promise to tell nobody, Meg, or just no to tell me," he pressed her, of a sudden suspecting Tommy.

"Just no to tell you," she answered, and at that,

"Da-a-a," began the Dominie, and then saved his reputation by adding "gont." The derivation of the word dagont has puzzled many, but here we seem to have it.

It is interesting to know what Tommy wrote. The general opinion was that his letter must have been a triumph of eloquent appeal, and indeed he had first sketched out several masterpieces, all of some length and in different styles, but on the whole not unlike the concoctions of Meggy's former secretary; that is, he had dwelt on the duties of daughters, on the hardness of the times, on the certainty that if Katherine helped this time assistance would never be needed again. This sort of thing had always satisfied

the Dominie, but Tommy, despite his several attempts, had a vague consciousness that there was something second-rate about them, and he tapped on his brain till it responded. The letter he despatched to Ireland, but had the wisdom not to read aloud even to Meggy, contained nothing save her own words, "Dear Kaytherine, if you dinna send ten shillings immediately, your puir auld mother will have neither house nor hame. I'm crying to you for 't, Kaytherine; hearken and you'll hear my cry across the cauldrieff sea." It was a call from the heart which transported Katherine to Thrums in a second of time, she seemed to see her mother again, grown frail since last they met—and so all was well for Meggy. Tommy did not put all this to himself but he felt it, and after that he *could not* have written the letter differently. Happy Tommy! To be an artist is a great thing, but to be an artist and not know it is the most glorious plight in the world.

Other fickle clients put their correspondence into the boy's hands, and Cathro found it out but said nothing. Dignity kept him in check; he did not even let the tawse speak for him. So well did he dissemble that Tommy could not decide how much he knew, and dreaded his getting hold of some of the letters, yet pined to watch his face while he read them. This could not last forever. Mr. Cathro was like a haughty kettle which has choked its spout that none may know it has come a-boil, and we all know what in that event must happen sooner or later to the lid.

The three boys who had college in the tail of their eye had certain privileges not for the herd. It was taken for granted that when knowledge came their way they needed no overseer to make them stand their ground, and accordingly for a great part of the day they had a back bench to themselves, with half a dozen hedges of boys and girls between them and the Dominie. From his chair Mr. Cathro could not see them, but a foot-board was nailed to it, and when he stood on this, as he had an aggravating trick of doing, softly and swiftly, they were suddenly in view. A large fire had been burning all day and the atmosphere was soporific. Mr. Cathro was so sleepy himself that the sight of a nodding head enraged him like a cari-

cature, and he was on the foot-board frequently for the reason that makes bearded men suck peppermints in church. Against his better judgment he took several peeps at Tommy, whom he had lately suspected of writing his letters in school or at least of gloating over them on that back bench. To-day he was sure of it. However absorbing Euclid may be, even the forty-seventh of the first book does not make you chuckle and wag your head; you can bring a substantive in Virgil back to the verb that has lost it without looking as if you would like to exhibit them together in the square. But Tommy was thus elated until he gave way to grief of the most affecting kind. Now he looked gloomily before him as if all was over, now he buried his face in his hands, next his eyes were closed as if in prayer. All this the Dominie stood from him, but when at last he began to blubber—

At the black-board was an arithmetic class, slates in hand, each member adding up aloud in turn a row of figures. By and by it was known that Cathro had ceased to listen. "Go on," his voice rather than himself said, and he accepted Mary Dundas's trembling assertion that four and seven make ten. Such was the faith in Cathro that even boys who could add promptly turned their eleven into ten, and he did not catch them at it. So obviously was his mind as well as his gaze on something beyond, that Sandy Riach, a wit who had been waiting his chance for years, snapped at it now, and roared "Ten and eleven, nineteen" ("Go on," said Cathro), "and four, twenty," gasped Sandy, "and eight, sixteen," he added, gaining courage. "Very good," murmured the Dominie, whereupon Sandy clenched his reputation forever by saying, in one glorious mouthful, "and six, eleven, and two, five, and one, nocht."

There was no laughing at it then (though Sandy held a levee in the evening), they were all so stricken with amazement. By one movement they swung round to see what had fascinated Cathro, and the other classes doing likewise, Tommy became suddenly the centre of observation. Big tears were slinking down his face, and falling on some sheets of paper, which emotion prevented his concealing. Anon the unusual stillness in the school made him look up, but

he was dazed, like one uncertain of his whereabouts, and he blinked rapidly to clear his eyes, as a bird shakes water from its wings.

Mr. Cathro first uttered what was afterward described as a kind of throttled skirl, and then he roared "Come here!" whereupon Tommy stepped forward heavily, and tried, as commanded, to come to his senses, but it was not easy to make so long a journey in a moment, and several times, as he seemed about to conquer his tears, a wave of feeling set them flowing again.

"Take your time," said Mr. Cathro, grimly, "I can wait," and this had such a helpful effect that Tommy was able presently to speak up for his misdeeds. They consisted of some letters written at home but brought to the school for private reading, and the Dominie got a nasty jar when he saw that they were all signed "Betsy Grieve." Miss Betsy Grieve, servant to Mr. Duthie, was about to marry, and these letters were acknowledgments of wedding presents. Now, Mr. Cathro had written similar letters for Betsy only a few days before.

"Did she ask you to write these for her?" he demanded, fuming, and Tommy replied demurely that she had. He could not help adding, though he felt the unwisdom of it, "She got some other body to do them first, but his letters didna satisfy her."

"Oh!" said Mr. Cathro, and it was such a vicious oh that Tommy squeaked tremblingly, "I dinna know who he was."

Keeping his mouth shut by gripping his underlip with his teeth, the Dominie read the letters, and Tommy gazed eagerly at him, all fear forgotten, soul conquering body. The others stood or sat waiting, perplexed as to the cause, confident of the issue. The letters were much finer productions than Cathro's, he had to admit to himself as he read. Yet the rivals had started fair, for Betsy was a recent immigrant from Dunkeld way, and the letters were to people known neither to Tommy nor to the Dominie. Also, she had given the same details for the guidance of each. A lady had sent a teapot, which affected to be new, but was not; Betsy recognized it by a scratch on the lid, and wanted to scratch back, but politely. So Tommy wrote, "When you come to see me we shall have a cup of tea out of your

beautiful present; and it will be like a meeting of three old friends." That was perhaps too polite, Betsy feared, but Tommy said authoritatively, "No, the politer the nipper."

There was a set of six cups and saucers from Peter something, who had loved Betsy in vain. She had shown the Dominie and Tommy the ear-rings given her long ago by Peter (they were bought with 'Sosh checks) and the poem he had written about them, and she was most anxious to gratify him in her reply. All Cathro could do, however, was to wish Peter well in some ornate sentences, while Tommy's was a letter that only a tender woman's heart could have indited, with such beautiful touches about the days which are no more alas forever, that Betsy listened to it with heaving breast and felt so sorry for her old swain that, forgetting she had never loved him, she all but gave Andrew the go-by and returned to Peter. As for Peter, who had been getting over his trouble, he saw now for the first time what he had lost, and he carried Betsy's dear letter in his outer pocket and was inconsolable.

But the masterpiece went to Mrs. Dinnie, baker, in return for a flagon bun. Long ago her daughter, Janet, and Betsy had agreed to marry on the same day, and many a quip had Mrs. Dinnie cast at their romantic compact. But Janet died, and so it was a sad letter that Tommy had to write to her mother. "I'm doubting you're no auld enough for this ane," soft-hearted Betsy said, but she did not know her man. "Tell me some one thing the mother used often to say when she was taking her fun off the pair of you," he said, and "Where is she buried?" was a suggestive question, with the happy tag, "Is there a tree hanging over the grave?" Thus assisted, he composed a letter that had a tear in every sentence. Betsy rubbed her eyes red over it, and not all its sentiments were allowed to die, for Mrs. Dinnie, touched to the heart, printed the best of them in black licorice on short bread for funeral feasts, at which they gave rise to solemn reflections as they went down.

Nevertheless, this letter affected none so much as the writer of it. His first rough sketch became so damp as he wrote that he had to abandon his pen and take to pencil; while he was revis-

ing he had often to desist to dry his eyes on the coverlet of Aaron's bed, which made Elspeth weep also, though she had no notion what he was at. But when the work was finished he took her into the secret and read his letter to her, and he almost choked as he did so. Yet he smiled rapturously through his woe, and she knew no better than to be proud of him, and he woke next morning with a cold, brought on you can see how, but his triumph was worth its price.

Having read the letter in an uncanny silence, Mr. Cathro unbottled Tommy for the details, and out they came with a rush, blowing away the cork discretion. Yet was the Dominie slow to strike; he seemed to find more satisfaction in surveying his young friend with a wondering gaze that had a dash of admiration in it, which Tommy was the first to note.

"I don't mind admitting before the whole school," said Mr. Cathro, slowly, "that if these letters had been addressed to me they would have taken me in."

Tommy tried to look modest, but his chest would have its way.

"You little sacket," cried the Dominie, "how did you manage it?"

"I think I thought I was Betsy at the time," Tommy answered, with proper awe.

"She told me nothing about the weeping-willow at the grave," said the Dominie, perhaps in self-defense.

"You hadna speired if there was one," retorted Tommy, jealously.

"What made you think of it?"

"I saw it might come in neat." (He had said in the letter that the weeping-willow reminded him of the days when Janet's bonny hair hung down kissing her waist just as the willow kissed the grave.)

"Willows don't hang so low as you seem to think," said the Dominie.

"Yes, they do," replied Tommy, "I walked three miles to see one to make sure. I was near putting in another beautiful bit about weeping-willows."

"Well, why didn't you?"

Tommy looked up with an impudent snigger. "You could never guess," he said.

"Answer me at once," thundered his preceptor, "Was it because—"

"No," interrupted Tommy, so conscious of Mr. Cathro's inferiority that to let

him go on seemed waste of time. "It was because, though it is a beautiful thing in itself, I felt a servant lassie wouldna have thought o't. I was sweer," he admitted, with a sigh; then firmly, "but I cut it out."

Again Cathro admired, reluctantly. The hack does feel the difference between himself and the artist. Cathro might possibly have had the idea, he could not have cut it out.

But the hack is sometimes, or usually, or nearly always the artist's master, and can make him suffer for his dem'd superiority.

"What made you snivel when you read the pathetic bits?" asked Cathro, with itching fingers.

"I was so sorry for Peter and Mrs. Dinnie," Tommy answered, a little puzzled himself now. "I saw them so clear."

"And yet until Betsy came to you, you had never heard tell of them?"

"No."

"And on reflection you don't care a doit about them?"

"N-no."

"And you care as little for Betsy?"

"No now, but at the time I a kind of thought I was to be married to Andrew."

"And even while you blubbered you

were saying to yourself, 'What a clever billie I am!'"

Mr. Cathro had certainly intended to end the scene with the strap, but as he stretched out his hand for it he had another idea. "Do you know why Nether Drumgley's sheep are branded with the letters N.D.?" he asked his pupils, and a dozen replied, "So as all may ken wha they belong to."

"Precisely," said Mr. Cathro, "and similarly they used to brand a letter on a felon, so that all might know whom *he* belonged to." He crossed to the fireplace, and, picking up a charred stick, wrote with it on the forehead of startled Tommy the letters "S.T."

"Now," said the Dominie complacently, "we know to whom Tommy belongs."

All were so taken aback that for some seconds nothing could be heard save Tommy indignantly wiping his brow; then "What is he?" cried one, the mouth-piece of half a hundred.

"He is one of the two proprietors we have just been speaking of," replied Cathro, dryly, and turning again to Tommy, he said, "Wipe away, Sentimental Tommy, try hot water, try cold water, try a knife, but you will never get these letters off you; you are branded for ever and ever."

THE MERCIFUL KNIGHT

GIOVANNI GUALBERTO was a noble knight of the eleventh century, born in Florence of a rich and distinguished family. When he was still a young man his only brother, Hugo, whom he dearly loved, was murdered by a man with whom he had a quarrel. Gualberto, whose grief and fury were stimulated by the rage of his father and the tears of his mother, set forth in pursuit of the assassin, vowing prompt and terrible vengeance.

It so happened that when he was returning to his father's villa on the evening of Good Friday he took his way over the steep, narrow, winding road which leads from the city gate to the Church of San Miniato. About halfway up the hill, where the road turns to the right, he came suddenly upon his brother's murderer. His enemy was alone and unarmed, and at the sight of the assassin, given, as it were, into his hand, Gualberto quickly drew his sword to slay him. The miserable wretch, seeing no means of es-

cape, fell upon his knees and begged for mercy, and extending his arms in the form of a cross, implored him, in remembrance of the Christ who had suffered on that day, to spare his life.

Gualberto, struck with sudden compassion, remembering how Christ from the cross had prayed, "Father, forgive them," stayed his uplifted sword; and after a moment of terrible conflict with his own heart, and a prayer for divine support, he held out his hand, raised the suppliant from the ground and embraced him as a token of forgiveness.

Gualberto proceeded on his way in sorrowful mood, thinking only of the crime he had so nearly committed. The story is that he entered a wayside shrine and knelt before the crucifix, and as he did so the figure of the Christ seemed to bend down from the cross to embrace him. He forsook the world and entered the monastery of San Miniato. Later he founded the famous order at Vallombrosa.

CHILDE ROLAND TO THE DARK TOWER CAME

ONLY a few wise old peasant women still remember the story of Childe Roland, and relate it to their children by the winter fire; but it seems to have been one of the favorite fairy tales of Shakespeare, and in *King Lear* he brings in a line from an ancient ballad, "Childe Rowland to the dark tower came," which none of the learned editors of his plays was able to explain. For the ancient ballad is now forgotten. The word "Childe" is a title meaning "a youth of noble birth."

was in the days before the path to the Land of Faerie had disappeared. They had often heard how near was their part of the North Country to the enchanted Land of the Hidden Host.

"Surely no evil could have befallen her so near a church," said the eldest brother.

"No, unless, brother, she did go 'withershins,'" said Roland.

"What is withershins?" said the other brother.

"The opposite way to the sun," said Roland. "The sun rises by the hill,



Reaching the green hill, Childe Roland followed the directions of the henwife.
From the painting by J. MacWhirter, R.A., published by permission.

Childe Roland, they say, was one of the sons of King Arthur; he had two elder brothers and a young and beautiful sister, Lady Ellen. The girl was so lovely that she was always called Burd Ellen, which means "Fair Ellen." One day they were all playing at ball in merry Carlisle, and Childe Roland gave the ball such a powerful kick that he sent it right over the church. Burd Ellen laughed and ran to find the ball.

While they waited the boys found a frog and amused themselves by watching its queer leaps. Suddenly Childe Roland remembered how long Ellen had been gone. He called her name again and again, but there was no answer. Then a great fear came upon them, for this

passes the front of the church and sets behind the castle. Ellen ran around behind the church, exactly withershins."

"Then she is enchanted," said the eldest.

Her brothers looked for her up and down Carlisle, but they could not find her, and they were obliged to take the sad news to their parents. Time passed and the great castle was sad and lonely without the lovely Lady Ellen.

At last the eldest brother went to the famous wizard Merlin and asked him if he knew where his sister was. "Burd Ellen," said Merlin, "has been carried away by the fairies. She is now in the castle of the King of Elfland. There is not a knight in Christendom that could

set her free." The two elder brothers, however, bravely resolved to attempt to rescue their sister, and after receiving much wise advice from Merlin, first one and then the other set out on the perilous enterprise. They never returned.

Childe Roland had begged to go, but his parents were afraid to lose him also. When his brothers did not come home he went to Merlin's cave and asked for help and counsel, for he, too, was determined to risk his life in seeking his beautiful sister. The good wizard gave him full instructions how to get to the Land of Faerie, and added: "And when you get into the Land of Faerie there is one thing you must not do. You must not touch food or drink. Upon this your fate and that of your sister and brothers depend."

After a long journey Childe Roland came to a meadow where coal-black horses were grazing. Their eyes flashed fire, and by this he knew that he had come to the Land of Faerie. He rode up to the herdsman and said to him: "Can you tell me where is the castle of the King of Elfland?"

"I cannot," replied the fairy herdsman, "but you will find a cowherd farther on, and perhaps he will know where the castle is situated."

Coming up to the cowherd, Childe Roland asked him the same question, and was told to go to the henwife in the valley.

"Ride on," said the fairy henwife, when he came to her, "till you arrive at a green hill encircled from top to bottom with terraces, where the King of Elfland lives. Three times must you go withershins round it, saying:

"Open, door; open, door;
Let me come in!"

Childe Roland followed the directions that were given by the fairy henwife, and a door opened in the green hill and closed behind him as he ran up a long passage leading to the castle of the King of Elfland.

He came into an immense hall upheld by pillars of gold and silver and arches of diamonds. Hanging on a golden chain from the middle of the roof was a large, hollow, transparent pearl, and in the pearl was a magic carbuncle which lighted up the hall with a beautiful radiance. Rubies and emeralds flashed and flamed

everywhere, and at the end of the hall, under a canopy, Burd Ellen was sitting combing her golden hair with a silver comb.

"Go back, Roland!" she cried. "Go back! If you had a hundred thousand lives you could not win me back from the wicked King of Elfland."

"I have come to rescue you and take you home," said Roland boldly, "and will fight him; never fear."

She smiled, and they sat talking of the past a while.

"I am thirsty," said Roland suddenly, "and it is long since I have tasted food. Will you bring me some food, Ellen?"

Ellen rose, but tears streamed down her face. Roland remembered in a flash Merlin's counsel, and when Ellen returned with the bowl of milk and fairy bread he dashed it to the ground, exclaiming: "I will neither eat nor drink until I succeed in setting you free."

At that moment the King of Elfland burst into the hall, terrible in armor made of the scales of dragons. Thrusting at Roland with his sword, he tried to pierce his heart, but Roland drew his father's magic sword Excalibur and rushed upon the King. For hours they fought, until Roland conquered and the King was disarmed at his feet.

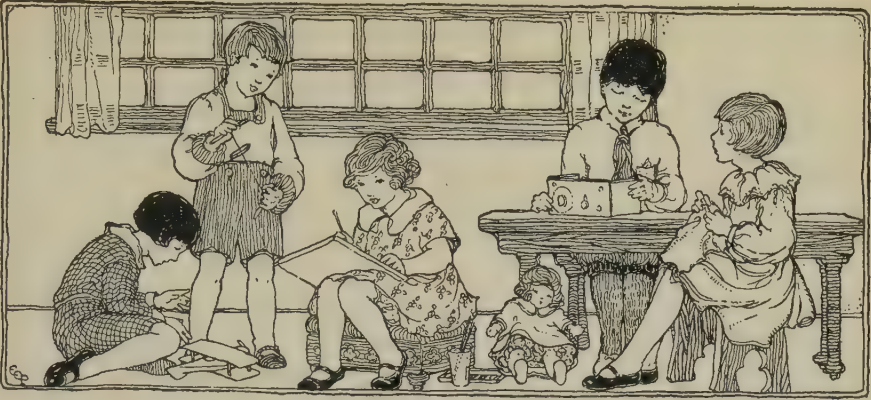
Then he took the spell from the two brothers who had been turned to stone, gave Burd Ellen to Childe Roland, and uttered a magic word. And behold, the four found themselves standing by the church, and in the bushes, old and weather-worn, was the lost ball!

Robert Browning, the great and wise poet, was fascinated by the words "Childe Roland to the Dark Tower came." The line stayed in his memory and haunted him until he was impelled to write a poem of his own with that as the title. Perhaps the poem will not mean much to boys and girls, but later on in life understanding and appreciation of it may come. The last stanza of Browning's poem reads thus:

There they stood, ranged along the hillsides,
met

To view the last of me, a living frame
For one more picture! in a sheet of flame
I saw them and I knew them all. And yet
Dauntless the slug-horn to my lips I set,
And blew "Childe Roland to the Dark
Tower came."

THE NEXT STORIES ARE ON PAGE 3347.



GOLF FOR BOYS AND GIRLS

GOLF is one of the few outdoor games in which boys and girls can compete on equal terms because skill counts most.

A golfing outfit for a boy or girl consists of four clubs, which are called a driver, a cleek, a mashie and a putter, and they should be carried in a light canvas bag. The driver is a wooden-headed club; the cleek, mashie, or "lofter," and putter are iron-headed; and the cost of each is from a dollar up. In addition there should, of course, be two or three golf-balls.

The driver is used for driving off from the tee; the cleek is for an "approach" shot—that is to say, for the intermediate shot, or shots, less than a hundred yards in distance, and taken between the spot where the ball rests after we have made our drive and its arrival at the green. The mashie is employed in place of the cleek if the lie, or position, of the ball is awkward—if, for example, it is in a hole or has rolled into a bunker, or is lying on very rough ground. Owing to the curious shape of the head of the mashie, it is specially useful for "lofting" the ball up out of a difficult place, which is done by striking the ball very low down, almost from underneath, in fact. The putter is used when the ball is on the green, to play it into the hole.

A match usually consists of two players. When four players play together the match is called a "foursome," each pair of partners in this case sharing a ball, and taking it in turns to strike. An ordinary full-sized golf-links consists of eighteen holes, each of which is set in the middle of a putting-green, and it is the object of the player to get the ball into each hole in fewer strokes than his or her opponent.

Close beside each putting-green there will be found a teeing-ground—a small, flat, slightly raised platform, which is provided with a box of sand and an indicator

CONTINUED FROM 120

showing the direction of the next hole. Now, a proper golf-links is laid out in such a manner that the direct line from each teeing-ground to the next hole is comparatively clear of obstacles, so that by correct play it is possible to reach the putting-green surrounding the hole without getting into difficulties; any deviation from this straight course, however, will be found to lead the player into trouble. His ball will get into a bunker, either natural or artificial, for most golf-links are provided with each kind.

A belt of low bushes, a ditch, a pond, a shallow trench filled with a layer of sand and with a bank of earth running the length of it on the opposite side, all make suitable bunkers, and the difficulty of getting through, or over, or out of any of these hazards when once one is in them will be readily understood. The player's principal object therefore is, first, to learn to hit a ball true in the centre with the middle of the club-head, so that it may travel straight, not "slicing" or pulling it to right or left, or topping it, so that, instead of soaring away for from 120 to 150 yards, as it should do easily, before coming to earth, if properly hit, it pitches dead into some obstacle a short distance away, whence it can be extricated only after endless trouble. Often there is a bunker between the player and the straight line to the hole, but this is placed in such a position that a correct shot should carry the ball over it toward the green.

To begin the game, the player must prepare to drive off from the teeing-ground. The first thing to do is to make a tee with a small handful of sand, pressing it together with the fingers to form a small pyramid. Upon the top of this the ball is lightly balanced, in order that the player may have a fair shot at it. Beginners usually like a rather high tee, while a practiced player will use scarcely any.

It is important, first of all, to study the correct way to hold a club. It must be grasped in the fingers with both wrists above, and must not be held in the palms of the hands. A glance at the pictures on pages 3249 and 3250 will teach us more than any written description. In driving, the *left* hand is the guiding force, the master hand, and in taking hold of the club the left hand must grasp it first, and then the right hand must be placed below it in the position shown. In order to drive off from the tee the golfer must stand in an easy position just opposite the ball, and at a convenient distance from it, with feet about 1½ feet apart, the weight of the body being distributed evenly between them. He must now "address" the ball, or act as though he were going to strike it, once or twice, to loosen the muscles of the shoulders and wrists.

Then, standing with spine straight and stiff, head and neck bent a little forward, knees slightly bent, and eyes fixed on the spot just behind and beneath the ball, he swings the club up and behind the back of the neck until it lies almost across the back of his shoulders. His entire weight meanwhile is transferred to the right foot, while the left foot rises upon the toe with the left knee turned inward. The backward swing thus taken finally blends into one long, continuous movement. With the forward swing the shoulders come completely round and the weight passes from the right foot to the left, the right foot rising upon the toe and the right knee turning inward as the player sweeps the ball off the tee in the course of the swing and follows its direction with the club, his eyes still fixed on the spot where the ball was for at least a second after it has been swept away. The finish of the stroke finds him in the position seen in the picture, with the right shoulder swung completely round and pointing in the direction in which the ball has traveled, and the club laid flat across his shoulders. The club, during the full swing of the drive, describes an almost complete circle.

In playing the approach shot, or shots, with cleek or mashie, the same principles of keeping the eye on the ball and the same backward and forward swing are employed, the latter, however, in a less degree, the club being carried up only as far as the shoulder instead of high behind the head, in a half or three-quarter circle only.

The ball having reached the green, the position in which the putter is to be held is a matter to be left almost entirely to the discretion of the player.

The etiquette of golf is very strict, and the following rules must be carefully obeyed:

A player going round the links alone must always give way to a properly constituted match. No player, onlooker or caddie should move or talk during a stroke. Players looking for a lost ball must allow other players coming up behind to pass them.

Turf cut or displaced by a stroke must be replaced in position at once. No player should play from the tee until the party in front has played the second strokes and is out of range, and he must never play up to the putting-green until the party in front has holed out and moved away.

Among the most important rules of the game of golf are the following:

When the balls are in play the ball farthest from the hole which the players are approaching shall be played first, each player keeping his own score, except in a match, when each player keeps his opponent's score. The ball must be struck fairly, not pushed, spooned or scraped, under penalty of the loss of the hole. A ball must be played wherever it lies, or the hole must be given up; any *loose* stones or earth within a club's length of the ball may be removed, but the player may not move, bend or break anything fixed or growing near the ball. Loose obstructions may be removed from any part of the putting-green. A ball shall be considered lost if not found within five minutes after the search for it is begun. If a ball is lost the player loses the hole.

CLAY BUILDING BLOCKS OR BRICKS

ANY number of small building blocks or bricks may be easily made from clay. Perhaps you have some good clay which may be secured from a field in your locality. If so, this can be ground and mixed in a small wooden box for which some form of small tread roller may be used to run back and forth. While this roller may be cast of concrete or soft metal and then provided with a small handle, any form of flat iron wheel may be used for this purpose. Another mixing box will be needed for the clay. If this is built it should be of simple construction. After these necessary provisions are made, mix the clay with water until it is quite plastic.

Next, construct a number of molds of the desired size. These may be made either as single, or so-called unit, molds or as multiple molds. In either case a box form is needed of the size of the brick desired. For example, a good size for building blocks or the inside of the mold would be 1 inch thick, 2 inches wide, and 4

inches long. Of course the bottom should be made removable, and a little pusher might well be made just the size and shape of the brick. By means of this the clay may be easily pushed from the mold. The bricks are molded by pressing the mold full of clay, packing it well and then pushing out the newly formed brick. After being molded the bricks are dried and fired.

Now take all of the bricks which have been molded, spread them on a smooth board, and allow them to dry in the sun. Then pile these bricks in arch-like piles, preparatory to firing. The fires, which are built out of doors, should be made under and around the arches. Continue these fires until the bricks have been properly hardened. The best results are had by bringing the bricks to a red heat and allowing them to remain at this temperature for an hour or more. They are next allowed to cool gradually. If you have carefully followed these directions, the building bricks or blocks are ready for you to use.

GOLF AND HOW TO PLAY IT



The right way to grip a golf-club is shown here. The club must be held in the fingers and not in the palms of the hands. The left hand guides the stroke.



This picture shows the wrong way to hold the club. The wrists here are not properly placed, and the position and grip of the hands are quite wrong.



Here we see a player standing in the correct attitude and addressing the ball before taking his drive.



This is a view of the player swinging back in driving, the wrists being held well under the club.



This is the wrong way to hold the club in swinging back to drive. The left wrist being over instead of under the handle, the player could not hit straight, and his shot was spoiled.



After striking the ball the club must continue its swing, ending behind the head, the weight of the body being transferred from the right to the left foot in striking.

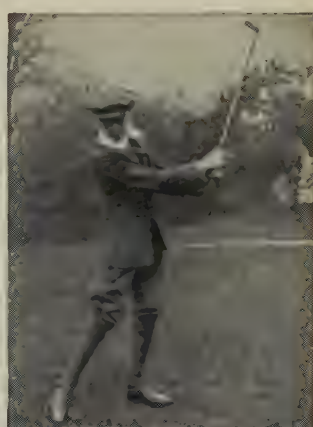
A HEALTHY GAME FOR BOYS AND GIRLS



This player is using the cleek, which is not carried so far back before striking as the driver is.



The stroke with the cleek is carried through in the same way as with the driver, but not so far round.



These pictures show the stroke with the mashie, a club adapted for "lofting" a ball over an obstacle. In the left picture the player addresses the ball; in the centre he is swinging back for a full shot; and the right-hand picture shows the stroke finish. The player keeps his eyes on the spot where the ball was



The putter is used on the green for knocking the ball into the hole. The player is addressing the ball.



Here the player has struck the ball, which is about to drop into the hole, having run perfectly straight.

These photographs were taken at the Golf School, Royal Botanical Gardens, London, by permission of Mr. Norman Salmond, the manager.

HOW TO MAKE INDIAN CLOTHING

THE Indian's suit was usually made of buckskin. It always consisted of leggings and a shirt or coat. He also wore moccasins and a war bonnet to match his suit. The suit is easily imitated by using yellow cambric. The shirt and leggings can be cut to fit the particular boy or girl. By folding the cloth, the leggings (picture 1) may be made with a single seam, as shown. The outer edges should be fringed. It is easier to let the cloth project about 2 inches beyond this seam. This may be cut into fringe with a pair of scissors, as shown in the illustration.

The shirt or coat (picture 2) is a simple garment. It is made to open from the neck over the shoulders. It may be fringed both at the sides and under the arms. The leggings and shirt are drawn over the other clothing and fastened with safety pins. The Indian way was to lace the shirt at the shoulders and fasten each legging to the belt with a strap as shown in picture 1. A bright-colored blanket can be used for a girl's costume. It should be thrown over the shoulders and fastened about the waist with a belt.

When this costume is used, the face may be painted. This is done by first rubbing the skin well with vaseline and then using Venetian red. The whole of the boy's face is painted, but only the cheeks of the girls are decorated. Indians did not paint the face or body for mere ornament, as each color had a meaning pertaining to their religious thoughts.

There are several forms of moccasins, or Indian shoes. Those used by the prairie tribes had three parts, namely the sole, the upper and the tongue. The soles were usually made of thick rawhide, while the tongues and uppers were made of buckskin. As an imitation to leather, white canvas may be used for the tongue and upper, while the sole may be cut from a piece of very thick felt. To determine the exact size of the pattern for the soles of the moccasins the boy or girl should first place the right foot, with the shoe removed, upon a piece of cardboard. Then the outline is drawn with a pencil and this is cut out with a pair of scissors as in picture 3. From another piece of cardboard the upper may be cut as in picture 4. Of course the sole and upper cut from these patterns will be for the right foot only. For the left foot the patterns are turned over.

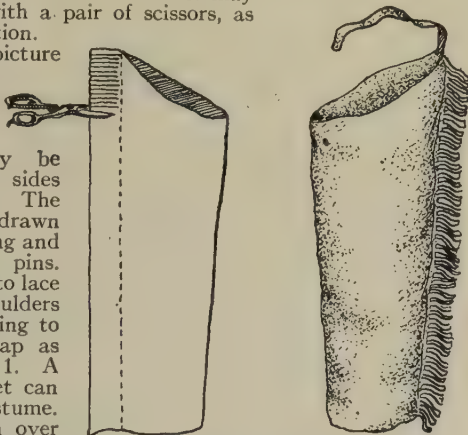
To fit a normal sized child seven years of age the length of the sole, *AB* (picture 3), should be about 8 inches; the width, *CD*, about $3\frac{1}{2}$ inches; and the width of heel, *EF*, about $2\frac{1}{2}$ inches. The upper (picture 4) should measure about 9 inches at *GH*; and the width, *IJ*, about $4\frac{1}{2}$ inches. Then make the cuts *KL* and *MH* with a pair of scissors. The first, which is halfway between the toe and heel, should be about 3 inches in length. In the corners *N* and *O* pierce two holes. In these, place a small leather string for lacing.

Now sew the upper on the sole, beginning at the toe. The heel is made by sewing *HP* and *HQ* together. If the moccasin is turned wrong side out before sewing, the seams will be neater. Next cut out the tongue from a piece of canvas. This should be about $3\frac{1}{2}$ inches long and 3 inches at the bottom. This is sewed to the upper so that the bottom will join *KL*. The completed moccasin is shown in picture 5.

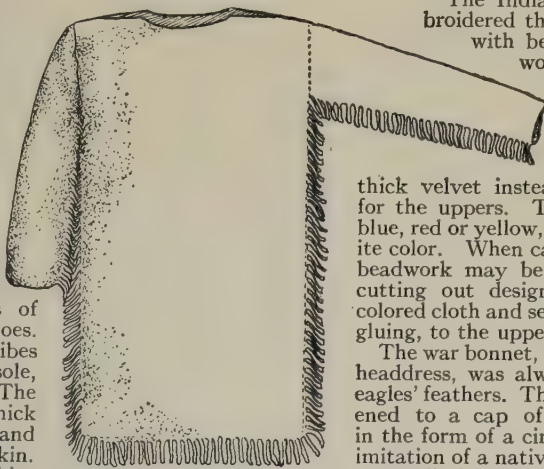
The Indians often embroidered their moccasins with beautiful beadwork. A pretty effect, not unlike embroidery, may be had by using

thick velvet instead of canvas for the uppers. These may be blue, red or yellow, or any favorite color. When canvas is used, beadwork may be imitated by cutting out designs in bright-colored cloth and sewing, or even gluing, to the uppers.

The war bonnet, or ceremonial headdress, was always made of eagles' feathers. These were fastened to a cap of buffalo-skin in the form of a circle. A good imitation of a native war bonnet can easily be made by taking an old hat of soft felt, cutting off the brim, and removing the band. Then secure about a dozen or more tail feathers of a turkey or rooster and cut the shaft of each feather to a point. With a penknife pierce two small openings in the crown just above the rim (see A, picture 6). Then put the point of the quill through the openings (see B, picture 6), and double the point back into the hollow shaft (see C, picture 6). This secures the feather to the felt crown. Now sew or tie a bit of red flannel around the base of the quill (see D and E, picture 6). This process is con-

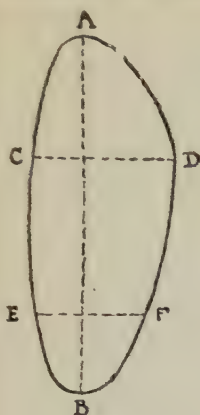


1. Fringed leggings.

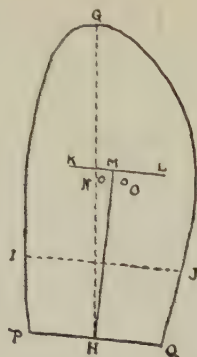


2. The Indian shirt.

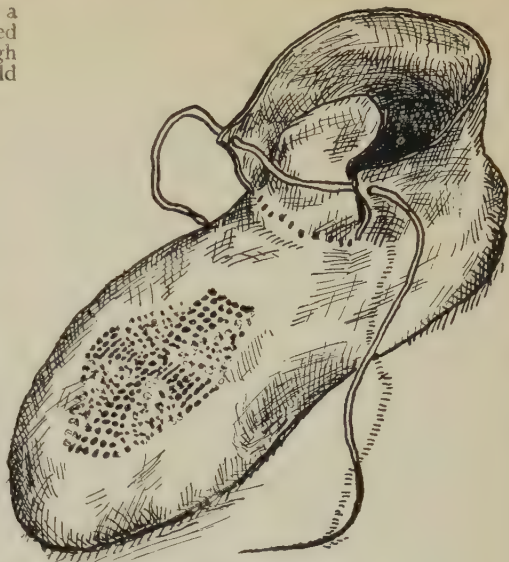
tinued until the felt crown is surrounded with a circlet of feathers (picture 7). These are fixed in place with a thread, which is drawn through the shafts of the feathers with a needle to hold



3. Moccasin sole.



4. Moccasin upper.



5. Completed moccasin.

them in place as shown in the finished war bonnet.

The Indian outfit is finally ready for use and any boy or girl may be proud to wear it.

This play suit ought to interest the wearer in the clothing that was worn by the Indians before the white man came. The hide of the buffalo was worn for robes by tribes of the plains, but the leather was too harsh for clothing generally. Elk and moose skins, though soft, were too thick; so, as a rule, the tanned skin of the deer became the most used material.

Belts of different materials were worn to support pouches, trinket-bags and so forth. Necklaces, earrings, charms and bracelets formed a part of the dress. In cold weather robes or capes of animal skins with the hair left on were added to the wardrobe of the red man.

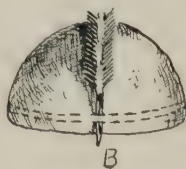
Ceremonial costume was much more elaborate than everyday costume just as it has



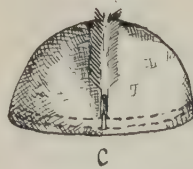
A



E



B

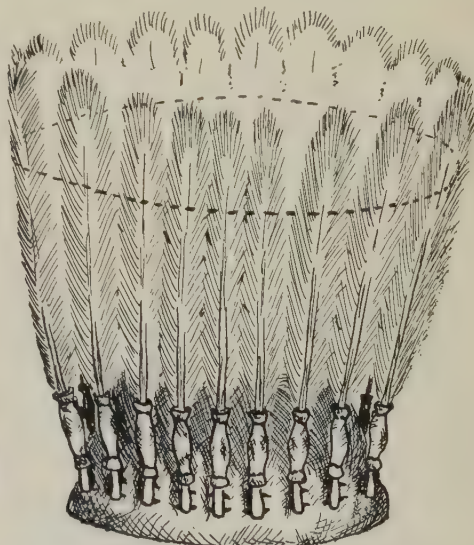


C



D

6. War bonnet undercap.



7. Finished war bonnet.

Other materials were made from bark, hair, fur, mountain-sheep wool, feathers and cotton. Sinew from tendons of the larger animals was used for thread, and bone awls served as needles. Men and women were equally skillful in sewing, and men and boys made their own clothing.

always been with white men. Moccasins and leggings were beaded with great skill and cunning design to attract attention to the owner. The great feathered war bonnets of big chiefs often trailed to the ground and were among the sights of a powwow.

HOW TO MAKE A WHEELBARROW

THE wheelbarrow shown in picture 1 is designed to give as little trouble as possible in making. It is a toy wheelbarrow suitable for boys, and when made will be found most useful. The wood used in the sides, bottom and front is $\frac{3}{4}$ inch thick. The wheel, legs and axle-bearers are 1 inch thick. The kind of wood used is ordinary pine. It should be planed all over, and the barrow, of course, will look better if it is painted.

The wheel by itself is shown in picture 2. To make it, take a piece of wood 1 inch thick, and large enough to mark on it a 10-inch circle, which represents the diameter of the wheel. Mark the circle and then saw round outside the line with a bow-saw or a keyhole saw. Another way is to cut the corners off with a tenon saw and then finish to the line by paring with a chisel. In both cases a chisel should be used after the saw to cut exactly to the circle, and after the chisel a spokeshave may be used to remove chisel-marks and to round the edges slightly. A wood-turner would make the wheel for a few cents, and it would be much better made than if made with a saw and chisel. Bosses, or side pieces, about 2 inches in diameter by $\frac{3}{4}$ inch thick, are put on each side of the wheel as shown. Their purpose is to keep the sides of the wheel from rubbing against the pieces in which the axle-ends fit. The bosses in the picture are shown of round shape, which is neatest, but they will do quite well if they are not round, but square or of any other shape. They should be nailed on exactly in the centre. The next thing is to fit an axle. This must be put into a hole bored through the wheel, and must fit rather tightly and stand out 1 inch at each side. A piece of $\frac{1}{4}$ -inch wire, $4\frac{1}{2}$ inches long, or a piece of ferrule about $\frac{1}{2}$ inch in diameter, will be best; but if these cannot easily be obtained, a wood axle made from $\frac{3}{4}$ -inch or $\frac{1}{2}$ -inch birch dowel-rod will do instead. The hole through the wheel should be bored halfway from one

side and halfway from the other, and great care should be taken to start exactly in the centre of the wheel. It is probable that the holes will not meet quite in line, but this will insure a tight fit for the axle. If the hole is bored right through from one side it is certain to come a little out of centre on the farther side, and this will cause the wheel to wobble instead of running truly with its axle.

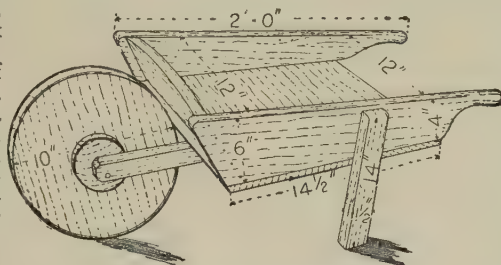
For the body of the barrow two pieces are required for the sides, as seen in picture 3. The handle part is marked to a suitable shape roughly by free hand, and worked with chisel and spokeshave. To get both sides alike, one should be cut first and the other marked from it by placing them together and marking

round with a pencil. The piece for the bottom is sawn $14\frac{1}{2}$ inches long and nailed on the under edges of the sides as in picture 1. The piece for the front, shown in picture 5, fits between the sides, and its bottom edge is beveled to allow it to slope. As the sides of the barrow are parallel in both directions, the ends of the front piece simply have to be made square. Its top edge will look better if it is curved as shown. The size and position of the legs is shown in picture 1. They are 14 inches long, $1\frac{1}{2}$ inches wide, and 1 inch thick, and have their top outside corners curved a little so as to look well. The best way to nail them is from the inside of the barrow, but one or two nails may be put through from the outside into the end grain of the bottom.

The only thing now left to do is to make the axle-bearers shown in picture 4, and put them on with the wheel between them. They are the same width and thickness as the legs, but are 18 inches long. The holes for the axle are bored toward the lower edge because the wood above

has to bear the weight of the barrow. The axle-ends should be an easy fit in these holes. They may be eased out and smoothed with a red-hot poker if the hole bored with the bit is too small. A little grease should be used afterward to make the axle run easily.

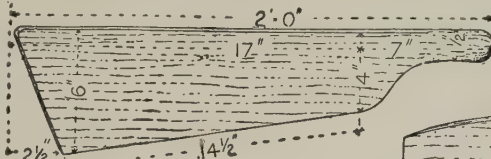
The best way to attach the bearers to the



1. The wheelbarrow finished.



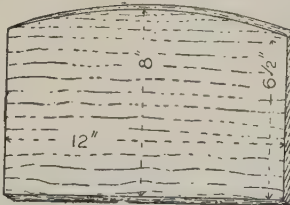
2. Wheel of barrow.



3. Side of body,



4. Axle-bearers.



5. Front of barrow.

has to bear the weight of the barrow. The axle-ends should be an easy fit in these holes. They may be eased out and smoothed with a red-hot poker if the hole bored with the bit is too small. A little grease should be used afterward to make the axle run easily.

bottom of the barrow will be to screw them, and it will be easier to put screws 2 inches long through the bearers into the bottom than through the bottom into the bearers, though the latter way would be a little stronger. Turn the barrow upside down and lay the bearers, with the wheel between them, on it. Adjust them in the middle of the barrow and parallel with its sides, so that the edge of the wheel is about $\frac{1}{2}$ inch clear of the front of

the barrow. Screw-holes should be bored through the bearers before this is done. No holes need be bored in the bottom, or only very small ones as a guide for the screws, and they can be made while the bearers are in position during screwing. The wheelbarrow is then completed, except that it may be given two coats of paint of any particular color or colors that may be desired. A coat of varnish over the paint is effective.

THINGS TO MAKE FROM AN ELDER BRANCH

WE all know the common elder tree which grows by the wayside, more like a big bush than a tree. It grows very quickly, and the juicy shoots soon harden into good tough wood. If we take one of these and examine it we shall find that the shoot, or branchlet, is really a wooden tube filled with pith, which can be easily taken out, and quite a number of interesting things can be made from the tube.

First of all, we can make a popgun, and for this purpose we must take a straight length of thick elder wood. We can push the pith out with an iron rod, if there is one handy, or, if there is not, with a rod made from a piece of oak, ash, pine or any other tough wood. This will afterward do for the ramrod of the gun.

We must make this rod 6 inches longer than the gun, and must leave a shoulder, or thick part, to prevent the rod from going right through the barrel. Picture 1 shows how this rod, or plunger, works. With knife, glass and glass-paper we make the rod nicely smooth and straight, for it must move comfortably in the barrel, being neither too tight nor too loose. If it is too tight, it will split the barrel and our work will be spoilt, and if it is too loose, our popgun will not work. Before pushing out the pith we must

rub the rod with soap, and, if necessary, tap the end of the rod with a piece of wood. When the rod is nearly through, the pith will spring out from the other end of the barrel. Then we wrap a piece of sandpaper around the ramrod, tie it on at the shoulder end, and work it through the barrel from both ends. This will clear the inside and make it smooth. Now, if we take two small corks shaped like those in picture 2 that fit the tube tightly, soap them to make them work easily, and put them in the end of the tube, we can fire them out by pushing the ramrod down quickly.

Next, if we tie a little worsted tightly around the end of the plunger as shown in picture 3, and insert a tube or quill into one of the corks as in picture 4, and fix the cork with the quill firmly into the end of the

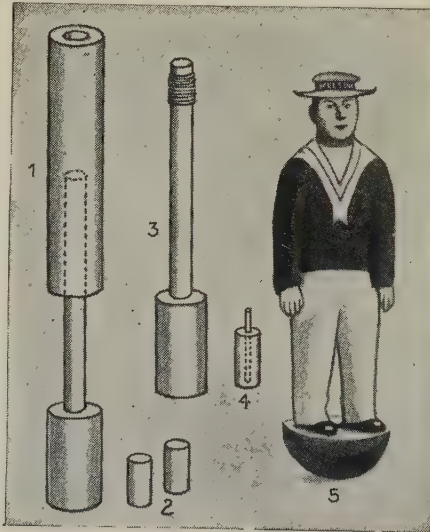
barrel, we shall have a most effective garden syringe. To make the necessary hole in the cork we burn it through with a red hot iron skewer. It is best in this case to bind the outside of both ends of the barrel with twine so that it may not split. To make a whistle we remove the cork with the nozzle and blow across the top hole of the gun, which we hold with the left hand. With the handle of the plunger in our right hand, we may, with practice, be able to play some simple tunes. We play the instrument in the same way that we should whistle with a key or with pan-pipes, making the scale by pushing the plunger up or pulling it down the barrel.

We can do something, too, with the pith which we took out of the tube. We first of all need a very sharp knife, and of course we must take care of our fingers. From a small piece of pith, about $1\frac{1}{2}$ inches long, we cut a slice off both sides, and then sketch a design for the figure of a man upon the flat surface of the pith. Next, we carefully trim away the pith with our knife until we have the shape that we want. Suppose we decide to make a little sailor boy, as shown in picture 5. The cap and arms may be made of separate pieces of pith and stuck to the body. After getting the figure ready in this way we

paint the hands and face a nice pink, the jersey white, the jacket blue, the trousers white, and the boots black. The cap can be white, with a band marked, "Dewey," for the name of the sailor's ship. This name we print with Indian ink or gold paint with a mapping pen. We must be sure to give the boy bright, laughing eyes, a well-shaped nose and chin, rosy cheeks and red lips. If we do all this our sailor lad will look a fine, brave fellow, quite ready for action. We make a base for the sailor to stand upon by cutting a large round leaden bullet in half with an old knife.

Of course there are all kinds of figures we can make out of the pith—soldiers, policemen, postmen, nurses and the like—and we can also model little animals and birds.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 3375.



1. Popgun. 2. Corks. 3. Plunger. 4. Tube for syringe. 5. Pith sailor.



MORE WORTHWHILE GAMES

CONTINUED FROM 3128

COUNTING, READING AND WRITING TO 102
WEIGHING, MEASURING AND EATING AS WE SHOULD

One Side

Other Side

—
—
—
—
28
27

32
31
30
29
28
27

HOW far can you count now? Do you sometimes have to stop at 9, or 19, or 29, or 39 and think what comes next? These places where you change, as from 20s to 30s or from 70s to 80s, are the only places that puzzle you, aren't they? Now that you can count by tens you can easily learn these.

Make some cards like the picture. Make a card for each of the places where you change tens.

12	22	32	42	52	62	72	82	92	102
11	21	31	41	51	61	71	81	91	101
10	20	30	40	50	60	70	80	90	100
9	19	29	39	49	59	69	79	89	99
8	18	28	38	48	58	68	78	88	98
7	17	27	37	47	57	67	77	87	97

Practice with these, mixing the cards all up and taking any one that comes on top. First practice counting and looking at the numbers. When you think you know them, try counting the side that has the blanks. See if you can do it fast and right.

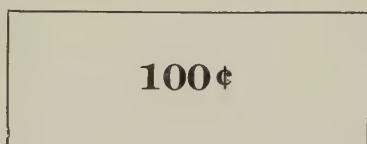
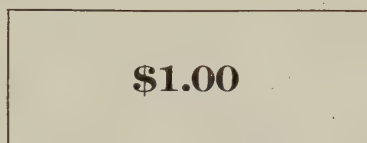
When you know how to read numbers like these: 100 75 50 25 15 10 5 you can read money.

- 100 cents are the same as one dollar, and you write it \$1.00
 50 cents are the same as half a dollar, and you write it \$.50
 25 cents are the same as a quarter of a dollar, and you write it \$.25
 10 cents are the same as a dime, and you write it \$.10
 5 cents are the same as a nickel and you write it \$.05

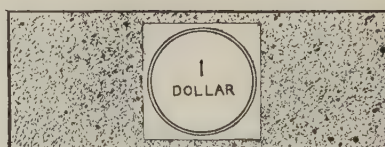
Make some game cards to help you learn money. The numbers, words and pictures are on pages 130 and 131 of your Work Book.

Plain Cards

Front



Back



DO you see how the children in these pictures measure themselves? How tall are you? How many inches? How much do you weigh? Write down both of these numbers, how many inches tall you are and how many pounds you weigh. There is a

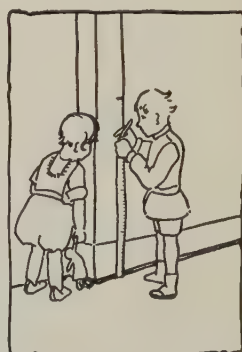


table of weights on this page. Look at it with mother and see how much other boys and girls weigh who are as old and as tall as you are.

This table is for girls.*

Height, Inches	5 Years	6 Years	7 Years	8 Years	9 Years
38	33	33			
39	34	34			
40	36	36	36		
41	37	37	37		
42	39	39	39		
43	41	41	41	41	
44	42	42	42	42	
45	45	45	45	45	45
46	47	47	47	48	48
47	49	50	50	50	50
48		52	52	52	52
49		54	54	55	55
50		56	56	57	58
51			59	60	61
52			63	64	64
53			66	67	67
54				69	70
55				72	74
56					76
57					80

This table is for boys.*

Height, Inches	5 Years	6 Years	7 Years	8 Years	9 Years
38	34	34			
39	35	35			
40	36	36			
41	38	38	38		
42	39	39	39	39	
43	41	41	41	41	
44	44	44	44	44	
45	46	46	46	46	46
46	47	48	48	48	48
47	49	50	50	50	50
48		52	53	53	53
49		55	55	55	55
50		57	58	58	58
51			61	61	61
52			63	64	64
53			66	67	67
54				70	70
55				72	72
56				75	76
57					79
58					83

* Baldwin-Wood Weight-Height-Age Tables. Reproduced by courtesy of the American Child Health Association.

Do you weigh about right? If you are a boy seven years old and fifty inches tall the table says you should weigh fifty-eight pounds. Of course the table can't tell you just exactly how much you should weigh. It means to tell you that you are growing all right if you weigh about fifty-eight pounds. Fifty-six or fifty-seven is all right or perhaps a few pounds more than fifty-eight. A girl seven years old and fifty inches tall should weigh about fifty-six pounds.



I WONDER if you eat the things that make you grow best. These things in the picture make you grow. Do you eat some of them every day? Try keeping a list each day of the things you eat that you know help you to grow.

Have you been having any progressive parties with sound games lately? How well are you scoring? Are you ready for some new games? Look at these words

three
think

shall
chair

who
when

children
she

Which of them begin like



?

Which of them begin like



?

Which of them begin like



?

Which of them begin like



?

Words that begin like these sounds make Set 5 of the blue sound

games. Set 6 has words that begin with other double sounds. In Sets 7 and 8 you listen for the vowel sounds. You remember in Set 4 you listened for vowel sounds. These are different vowel sounds. Sometimes a letter has one sound and sometimes it has another sound.

You will find the words, pictures and letters to make these games, on pages 127, 132, 133 and 134 of your Work Book. . You can add these games for your progressive parties.

When you can play all the sound games, you can puzzle out many of the new words you meet in your stories. You can sound the beginning, the middle and the end sounds. These words are not in your dictionary. See if you can puzzle out what they say:

nut	pan	bag	hit	sled	cap	hid
gun	frog	time	like	deep	west	line

WHAT HAVE YOU LEARNED?

CAN you count to 50? to 100?

How far can you count by tens?

Can you count five more, beginning with 17 37 and so on?

Can you write 34 52 68 73 and so on?

Can you write the figures for dollar, half a dollar, quarter of a dollar, dime, nickel and penny?

Do you know how tall you are? Do you know how much you weigh?
Do you know how old you are?

Do you weigh as much as a child should weigh who is as old as you and as tall as you?

Can you find out the foods that make you grow? Do you eat some every day?

Can you find out the names of some of the fruits and vegetables and other foods to write in your record, by sounding out the letters in the words?

Can you tell which words in the new sound games sound alike?

Can you find out new words in your stories just by saying the sounds of the letters?

VERY CURIOUS-LOOKING TREES



West African grass tree.



Pandanus.



Cannon-ball tree.



Spanish moss.



A great banyan tree under which ten thousand people can stand.

QUEER PLANTS

AS in the animal kingdom there are strange creatures that strike the imagination on account of their great size or grotesque form, so in the vegetable kingdom there are many plants that attract attention wherever they may be seen.

There are, for example, a number of trees that grow to enormous sizes, some in girth, some in height, and some in thickness of stem or diameter of leaf or blossom. Among these the banyan, or Indian fig, stands foremost. It is a relative of the common fig tree, and produces a multitude of little figs that grow in pairs, are scarlet in color, and about the size of a cherry.

But it is the banyan's amazing way of life that makes it so interesting. The trunk throws out branches, and as they grow they put out hanging roots which increase in length till they reach the ground, and there take root and develop into new stems. In this way the tree spreads farther and farther all round the original trunk, with an ever growing number of stems that become as thick as the trunk itself, and at last the banyan looks more like a wood than a single tree. This is clearly shown in the picture on page 2418.

The centre trunk may decay and die, but the tree lives on, supported by the many root-stems it throws down, and

CONTINUED FROM 3156



drawing nourishment from the ground by their means. A banyan

may have as many as 350 of these stems, each as thick as the trunk of an oak, and, in addition, there may be two or three thousand more stems of lesser girth. Such a tree will cover an enormous area, and seven or eight thousand people can take shelter under its branches.

Hundreds of bats, birds and monkeys will make a banyan tree their home. The monkeys eat not only the fruits but the leaves, which are heart-shaped and grow about five or six inches long. Though there is so much stem, the wood of the banyan is too light and porous to be of value as timber, yet the tree is not lacking in commercial value, for it yields both lac and caoutchouc, and the bark is used by the Hindus as a medicine.

The banyan is much venerated by the Hindus, who plant it near their temples; if a village possesses no stone temple, the banyan tree itself is used as a temple, and the idol is placed under its branches. The tree, with its widely outstretched arms, is regarded as an emblem of the Creator of all things. As a shelter from the hot Eastern sun the tree has no equal.

A very near relative of the banyan is the bo tree, or sacred fig tree, of India

and Ceylon, which is looked upon as a holy plant by the Buddhists. It is said that the sites of ancient temples can always be identified as Brahmin or Buddhist according to whether there is growing near them the banyan or the bo tree. In general appearance the two are much alike, except that the bo tree sends down, not rootlets, but true branches which, as soon as they reach the ground, take root and become thick stems, as happens in the case of the banyan.

A LIVING TREE THAT WAS PLANTED BEFORE JESUS WAS BORN

The bo tree lives to a great age. One growing at the ruined city of Anuradhapura, about eighty miles north of Kandy, in Ceylon, is said to have been planted in 288 B.C., and to have originated from a branch of the tree under which Buddha sat and meditated. In 1887 the main stem broke off during a storm. The Buddhist priest reverently gathered the fragment and cremated it with great ceremony.

If the banyan is the biggest tree in regard to the amount of ground it covers, the baobab is the largest so far as girth of trunk is concerned. It is a relative of that familiar plant, the common mallow, and it is often called monkey's bread, because of the liking monkeys have for its fruit. It is a native of West Africa, but has now been introduced into the East and West Indies. Though it does not reach a height of more than sixty or seventy feet, it has a girth of nearly a hundred feet, and its branches, sixty feet long, often grow as thick as the trunk of an oak. The crown which they form at the top of the tree may be as much as five hundred feet in circumference.

The juicy, acid fruit forms a refreshing drink, and is in size and shape very much like a cucumber. It is much sought after in case of fever. The leaves also have a medicinal value, and the bark yields a strong fibre. In recent years attempts have been made to employ the fibre as a substitute for silk and cotton.

THE WONDERFUL BAOBAB TREE THAT NOTHING SEEMS TO KILL

The natives of West Africa remove the fibre while the tree is still living. They come again and again to the same tree till the baobab is completely stripped of its bark on the lower portion of the trunk. Instead of dying, as one might expect, the tree grows a fresh supply of bark. Its

vitality, indeed, is amazing. Often when the trunk is quite hollow, so that twenty or thirty men can stand inside, the tree goes on flourishing, and even if it is cut or blown down, it continues to form layers of fresh wood as it lies on the ground.

The tallest trees in the world are the giant Sequoia trees of California, and the Eucalyptus trees of Australia, exceptionally large specimens of which tower higher than a tall church spire. The Australian trees are rather taller than the American ones. A giant Eucalyptus seen by Dr. Alfred Russel Wallace after it had fallen was 500 feet high. They have bluish green leaves, leathery in texture, and these turn vertically with their edges, and not their faces, to the sun. On this account they throw little shadow.

The giant Sequoia trees of California, though on the average not quite so tall as the Australian Eucalyptus, are much more impressive. There is a grove of about a hundred of them in Calaveras County, California, which contains some amazing trees.

THE GIANT SEQUOIA TREES THAT LIVE FOR TWO THOUSAND YEARS

One of these huge giants, known as the "Mother of the Forest," is 327 feet high and 75 feet round its base. It is now dead, death having been caused by the removal of the bark, which was eighteen inches thick, for a distance of over a hundred feet up the trunk. A fallen monster called the "Father of the Forest" must have been 400 feet high at the time of its fall, and its trunk is over one hundred feet round at the base. The age of these mammoth trees has been estimated at between two and three thousand years.

Vast as are the Sequoia and Eucalyptus trees, they are not the tallest plants in the world, for the Quest, in its voyage to the southern seas, found round Cape Horn giant seaweeds growing which were at least 600 feet from the root to the top. One of these is pictured on page 880.

A somewhat strange-looking tree is the traveler's tree of Madagascar, a close relative of the banana. This rises as a succulent stem from the ground and sends out leaves on two opposite sides. The leaves are five or six feet long, and grow on the ends of stalks seven or eight feet long, giving the tree the general appearance of a gigantic fan. As the stem grows up, the lower leaves decay and fall off, so that the fan-like appearance is preserved.

QUEER MEMBERS OF THE BIG PLANT FAMILY



Traveler's tree.



Candle tree.



The enormous leaves of the Victoria Regia lily.

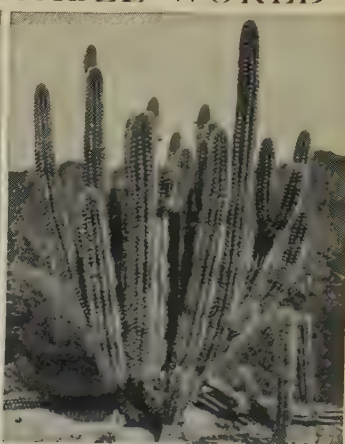
HEDGEHOGS OF THE VEGETABLE WORLD



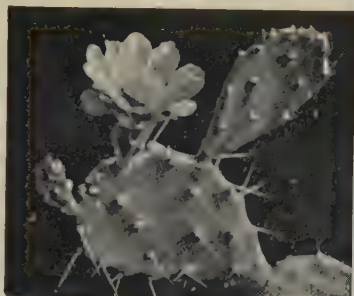
A Peruvian cactus.



Cactus in Arizona.



A West Indian cactus.



Opuntia, or prickly-pear.



Cactus in Trinidad.



A huge spur-like cactus in the Arizona desert, blown into this shape by the wind.

ALL SORTS AND CONDITIONS OF CACTUSES



A hedge of prickly-pear.



A cactus in flower.



The Turk's cap cactus.



A group of giant cactuses.



A very prickly cactus.



A queer cactus garden at Riverside, California.

The plant gets its name from the fact that the large cup-like sheaths of the leaf stalks contain considerable stores of good water, which travelers are able to tap by simply cutting the sheath at the base. The leaves are used for thatching by the people of Madagascar, and the stalks for walls and partitions.

THE TREE WITH FRUIT HANGING LIKE TALLOW CANDLES

Another queer tree is the candle tree, a native of the Isthmus of Panama, which produces its fruit in the form of what appear to be candles about four feet long. They are the color of yellow wax, and look for all the world like bunches of old-fashioned tallow candles. But the resemblance to a candle is not confined to the appearance. The fruits contain far more than half their weight of fat, and a lamp-oil is prepared from this.

A strange-looking tree in Australia is the so-called grass tree, a member of the Lily Family. On a stout stem as thick as an oak trunk, rising to fifteen or twenty feet, there grows a mass of grass-like foliage, and on the top a number of flower-stalks appear with blossoms that make them look like drum-sticks; hence the familiar name of the plant—the drum-stick grass tree. Another kind, called the arborescent grass tree, grows branches at the top; and another and smaller species at a distance has the general appearance of a native holding a spear, and is in consequence called by Australians the black boy, the local name for a native.

A member of the Myrtle Family growing in tropical America is known as the cannon-ball tree, because of the resemblance of its large, hard fruits to the old-fashioned cannon-ball. The tree produces large white or rosy flowers which spring from the trunk and branches, and these are succeeded by the round fruits, which have woody shells.

HOW THE MANGROVE ADDS TO THE DRY LAND OF THE WORLD

A very strange plant is the mangrove, many species of which are found in South America, the East and West Indies, China and northern Australia. The mangrove grows on the seacoast, especially round about the mouths of rivers. Sending down roots from the branches, it spreads rapidly and forms the familiar mangrove swamps. The tangle of roots closely interlaced retains the mud and other solid matter brought down by the river or

washed up by the waves, and gradually the area of the land is extended. The fruit of the mangrove is sweet and juicy and pleasant to the taste, and the bark yields a useful tannin.

The largest of all known flowers is the *Rafflesia arnoldi* of Sumatra, a parasite plant that consists of a flower without stem or leaves. This giant blossom, three feet in diameter, is flesh-colored and has the smell of carrion. It often weighs ten pounds, and its bowl-like centre is capable of holding two gallons of fluid. When it was first discovered, in 1818, by Dr. Arnold and Sir Stamford Raffles, after whom it is named, they hesitated to publish their discovery to the world, thinking their statement of the flower's size might be regarded as an exaggeration. The petals are in some parts three-quarters of an inch thick. While still unopened the plant is in form something like a cabbage. It takes a month to attain its full size, and, after opening, remains only for a day or two before it begins to decay.

THE WONDERFUL LEAF THAT GAVE THE IDEA FOR THE CRYSTAL PALACE

If the *Rafflesia* is the largest flower, another plant, the *Victoria regia*, a lily of South America, has the most gigantic leaf. This sometimes measures nearly forty feet round, and the first accounts of it brought by travelers were regarded as fairy tales. In 1837 Sir Robert Schomburgk, who had found it in British Guiana, described it to the Royal Geographical Society, and named it after Queen Victoria, who had just ascended the throne.

A thick rootstock in the bottom of the river throws up leaf-buds to the surface of the water, where they expand into what look like round green trays, with an edge all round turned up to a height of three or four inches. The back of the leaf is made up of a network of veins, giving it the appearance of wickerwork, and it was this formation that gave to Sir Joseph Paxton his idea for constructing the Crystal Palace.

The beautiful flowers, white outside and rose-colored inside, rising among the giant leaves, are a yard or more in circumference, and develop into fruits about the size of a man's head, full of starchy seeds which form a nourishing and agreeable food. It is because of these seeds that the plant is sometimes called the water-maize.

A very strange family of plants are the

QUEER PLANTS

cactuses, quite unlike the plants with which the people of Europe are generally familiar. In form they are grotesque and weird, and a landscape in which various kinds of cactus predominate is rather

should be able to do without water for long periods of drought. They have therefore modified their form and structure in such a way that they can take up and retain water when it falls in the



An Australian bottle tree.



A South African baobab tree.



A fallen giant—one of the big Sequoia trees of California.

suggestive of the strange fancies of a nightmare.

The plants are very interesting because they are a striking instance of adaptation to environment. They are natives of the more arid districts of America, and it is essential for their existence that they

form of rain, and at the same time resist the natural conditions of the dry and arid regions on which they live that would lead to rapid evaporation.

The cactuses have long roots that branch out extensively in the arid soil where they grow, and seize on every drop

of moisture that is available. Then, in order to reduce the rate of evaporation to a minimum, the cactus has ceased to produce leaves of the ordinary kind, which present an extensive surface to the sun and air, and have concentrated the whole plant into a more or less globular or cylindrical form, so that the very minimum of surface is presented.

AN EXPERIMENT WHICH HELPS US TO UNDERSTAND THE CACTUS

We can see what a difference this makes by a little experiment. If we take a turnip, we can stand it on a tea plate, but if we cut it up into thin slices and spread these out we can cover the floor of a room. The cactus, instead of being spread out in leaves like an oak or ivy, is concentrated into a comparatively small, compact space. The cells of which it is composed have thick walls, and these still further delay evaporation.

But there is another interesting fact about many members of the Cactus Family. The fact that they will grow in arid regions and retain much moisture makes them desirable as food for the herbivorous animals that live in the desert regions. The poor cactus, therefore, after changing its form to meet the hard conditions of life, would have to face the still greater danger of being snapped up as food and thus exterminated.

But the plant has proved equal to the emergency. In the course of ages it has done a wonderful thing in the way of self-defense. Instead of giving up its leaves altogether it has changed their form and grown them in the shape of thorns and prickles and sharp spines. These effectively protect the cactus from all enemies but man, who, using his brain, has found various ways of overcoming the defense.

MEN WHO GOT RID OF THE SPINES OF THE CACTUS

Sometimes he burns off the spines of the cactus and uses the plant as food for his cattle; but, as this is a long and tedious and costly process, he has done better, and has found a way of making the cactus grow without producing spikes at all.

As showing how well a cactus retains its moisture, it may be mentioned that an American giant cactus needed nearly two years to dry up when deprived of all water. It did not lose the whole of its water-content for 576 days.

The prickles and spines are very

marked in some cactuses, and it is not without reason that they are called the hedgehogs of the vegetable kingdom. Some of them, like the well-known prickly-pear, are often planted round a house to form an impenetrable barrier to animals and robbers. This particular plant, also called the Indian fig, is a native of both Americas, but it has been acclimatized in the Mediterranean countries, and in Australia it has flourished so well that it has become a menace to the farmers. It will grow on bare rock and spreads very rapidly. Its yellow fruit, about the size of a hen's egg, is very juicy and pleasant to the taste and is used largely as a food.

Altogether there are about a thousand different kinds of cactuses. Some, like the prickly-pear, have thick flattened stems, others look like pillars and columns, others like sponges, and others like hedgehogs or woolly bears. One, the torch-thistle, which grows to a great height, is like a gigantic club studded with nails. Another, the Turk's cap cactus, has what appears to be a fez crowning it; and another, Wislizen's cactus, has spines that are nearly as tough as steel needles. Many of them produce very beautiful flowers, and some will grow in the open air farther north than their original home. You can see several varieties of cactus in large greenhouses.

THE SPANISH MOSS WITH THE LONG AND SILVERY THREADS

One other queer plant is a native of southern United States. It goes variously by the name of Spanish moss, long moss and black moss, though it is not Spanish or black or a moss. It is what is known as an epiphyte; that is, a plant which grows on another plant but does not draw its nourishment from its host like a parasite. The long "moss," which is a flowering plant, is a relative of the pineapple. It has long silvery thread-like stems and leaves, which attach themselves to the branches of trees by suckers and hang in dense tufts which sometimes almost hide the foliage of the trees, and give a very beautiful appearance to the forests.

The plant is often gathered, steeped in water till the outer tissues can be washed off, and the dried fibrous remainder is used as a substitute for horsehair in stuffing mattresses and cushions.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 3391.

The Book of POETRY

A POEM OF DELIGHTFUL HUMOR

OLIVER WENDELL HOLMES wrote many delightfully amusing poems. Perhaps none of his verse is more popular than the story of the two-wheeled carriage, or chaise (often called a "shay"), built by the "Deacon" in 1755 and driven a hundred years before it fell to pieces. A curious thing about "The Deacon's Masterpiece, or The Wonderful One-Hoss Shay," is that it came into being at the time of an earthquake and lasted a whole century, going to pieces at the time of another earthquake.

THE WONDERFUL ONE-HOSS SHAY

HAVE you heard of
the wonderful
one-hoss shay,
That was built in such
a logical way
It ran a hundred years to a day,
And then, of a sudden, it—ah, but
stay,
I'll tell you what happened without
delay,
Scaring the parson into fits,
Frightening people out of their wits,—
Have you ever heard of that, I say?
Seventeen hundred and fifty-five.
Georgius Secundus was then alive,—
Snuffy old drone from the German hive.
That was the year when Lisbon-town
Saw the earth open and gulp her down,
And Braddock's army was done so brown,
Left without a scalp to its crown.
It was on the terrible Earthquake-day
That the Deacon finished the one-hoss shay.
Now in building of chaises, I tell you what,
There is always *somewhere* a weakest spot,
In hub, tire, felloe, in spring or thill,
In panel, or crossbar, or floor, or sill,
In screw, bolt, thoroughbrace,—lurking still,
Find it somewhere you must and will,—
Above or below, or within or without,—
And that's the reason, beyond a doubt,
That a chaise *breaks down*, but doesn't
wear out.

But the Deacon swore (as Deacons do,
With an "I dew vum" or an "I tell yeou")
He would build one shay to beat the taown,
'N' the keounty, 'n' all the kentry raoun';
It should be so built that it *couldn't* break
daown:

"Fur," said the Deacon, "it's mighty plain
That the weakes' place mus' stan' the strain;
'N' the way t' fix it, uz I maintain,
Is only jest
T' make that place uz strong uz the rest."

So the Deacon inquired of the village folk
Where he could find the strongest oak,
That couldn't be split, nor bent, nor broke—
That was for spokes, and floor, and sills;
He sent for lancewood to make the thills;
The crossbars were ash, from the straight-
est trees,

The panels of white-wood, that cuts like
cheese,

CONTINUED FROM 3112



But lasts like iron for
things like these;
The hubs of logs from
the "Settler's
ellum,"—

Last of its timber,—they couldn't
sell 'em,

Never an axe had seen their chips,
And the wedges flew from between
their lips,

Their blunt-ends frizzled like celery-tips;
Step and prop-iron, bolt and screw,
Spring, tire, axle, and linchpin too,
Steel of the finest, bright and blue;
Thoroughbrace bison-skin, thick and wide;
Boot, top, dasher, from tough old hide
Found in the pit when the tanner died.
That was the way he "put her through."
"There!" said the Deacon. "Naow she'll
dew!"

Do! I tell you, I rather guess
She was a wonder, and nothing less!
Colts grew horses, beards turned gray,
Deacon and deaconess dropped away,
Children and grandchildren—where were
they?

But there stood the stout old one-hoss
shay,
As fresh as on Lisbon-earthquake-day!

Eighteen hundred;—it came and found
The Deacon's masterpiece strong and sound.
Eighteen hundred increased by ten;—
"Hahnsum kerridge" they called it then.
Eighteen hundred and twenty came;—
Running as usual; much the same.
Thirty and forty at last arrive,
And then came fifty, and *fifty-five*.

Little of all we value here
Wakes on the morn of its hundredth year
Without both feeling and looking queer.
In fact, there's nothing that keeps its youth,
So far as I know, but a tree and truth.
This is a moral that runs at large;
Take it.—You're welcome.—No extra
charge.

First of November,—the earthquake-day—
There are traces of age in the one-hoss shay,
A general flavor of mild decay,
But nothing local, as one may say.
There couldn't be,—for the Deacon's art
Had made it so like in every part
That there wasn't a chance for one to start.

For the wheels were just as strong as the
thills,
And the floor was just as strong as the sills,
And the panels just as strong as the floor,
And the whipple-tree neither less nor more,
And the back crossbar as strong as the fore,
And spring and axle and hub *encore*.
And yet, *as a whole*, it is past a doubt,
In another hour it will be *worn out*!

First of November, 'Fifty-five!
This morning the parson takes a drive.
Now, small boys, get out of the way!
Here comes the wonderful one-hoss shay,
Drawn by a rat-tailed, ewe-necked bay.
"Huddup!" said the parson.—Off went they.

The parson was working his Sunday's text,—
Had got to *fifthly*, and stopped perplexed
At what the—Moses—was coming next.
All at once the horse stood still,
Close by the meet'n'-house on the hill.
First a shiver, and then a thrill,
Then something decidedly like a spill,—
And the parson was sitting upon a rock,
At half-past nine by the meet'n'-house clock,—
Just the hour of the Earthquake shock!
What do you think the parson found,
When he got up and stared around?
The poor old chaise in a heap or mound,
As if it had been to the mill and ground!
You see, of course, if you're not a dunce,
How it went to pieces all at once,—
All at once, and nothing first,
Just as bubbles do when they burst.
End of the wonderful one-hoss shay.
Logic is logic. That's all I say.

BEDOUIN SONG

The intensity of the Arab's devotion may be a matter of fact, or may be doubted; but his flowery manner of expression is well suggested here by Bayard Taylor.

FROM the Desert I come to thee
On a stallion shod with fire;
And the winds are left behind
In the speed of my desire.
Under thy window I stand,
And the midnight hears my cry:
I love thee, I love but thee,
With a love that shall not die
*Till the sun grows cold,
And the stars are old,
And the leaves of the Judgment
Book unfold!*

Look from thy window and see
My passion and my pain;
I lie on the sands below,
And I faint in thy disdain.
Let the night-winds touch thy brow
With the heat of my burning sigh,
And melt thee to hear the vow
Of a love that shall not die
*Till the sun grows cold,
And the stars are old,
And the leaves of the Judgment
Book unfold!*

My steps are nightly driven,
By the fever in my breast,
To hear from thy lattice breathed
The word that shall give me rest.

Open the door of thy heart,
And open thy chamber door,
And my kisses shall teach thy lips
The love that shall fade no more
*Till the sun grows cold,
And the stars are old,
And the leaves of the Judgment
Book unfold!*

OVER THE HILL

This poem is characteristic of George Macdonald's delicate fancy and tender feeling. How beautifully he suggests the wonder of this world and the glory of a world that is to be! A longer and considerably altered version of this poem has also been published under the title of Tell Me.

"TRAVELER, what lies over the hill?
Traveler, tell to me:
I am only a child—from the window-sill
Over I cannot see."

"Child, there's a valley over there,
Pretty and wooded and shy;
And a little brook that says, 'Take care,
Or I'll drown you by-and-by!'"

"And what comes next?"—"A little town,
And a towering hill again;
More hills and valleys, up and down,
And a river now and then."

"And what comes next?"—"A lonely moor
Without a beaten way;
And grey clouds sailing slow before
A wind that will not stay."

"And then?"—"Dark rocks and yellow sand,
And a moaning sea beside."

"And then?"—"More sea, more sea, more land,
And rivers deep and wide."

"And then?"—"Oh, rock and mountain and vale,
Rivers and fields and men,
Over and over—a weary tale—
And round to your home again."

"And is that all? Have you told the best?"
"No; neither the best nor the end.
On summer eves, away in the west
You will see a stair ascend."

"Built of all colours of lovely stones—
A stair up into the sky,
Where no one is weary, and no one moans,
Or wants to be laid by."

"I will go."—"But the steps are very steep;
If you would climb up there,
You must lie at the foot, as still as sleep,
A very step of the stair."

GENTLE JESUS, MEEK AND MILD

This tiny hymn for little children was written by Charles Wesley about the year 1740, and is now the only one of his children's hymns sung in our churches to-day. It has been said that he wrote it for his own children; but this cannot be correct, as he did not marry until long afterward.

GENTLE JESUS, meek and mild,
Look upon this little child;
Pity my simplicity,
Suffer me to come to Thee.
Fain I would to Thee be brought,
Gracious God, forbid it not;
In the kingdom of Thy grace
Grant Thy little child a place.

THE CANADIAN BOAT SONG

FAIR these broad meads—these hoary woods
are grand;
But we are exiles from our fathers' land.

Listen to me, as when ye heard our father
Sing long ago the song of other shores—
Listen to me, and then in chorus gather
All your deep voices, as ye pull your oars.

From the lone shieling of the misty island
Mountains divide us, and the waste of seas—
Yet still the blood is strong, the heart is High-
land,
And we in dreams behold the Hebrides.

We ne'er shall tread the fancy-haunted valley,
Where 'tween the dark hills creeps the
small clear stream,
In arms around the patriarch banner rally,
Nor see the moon on royal tombstones
gleam.

When the bold kindred, in the time long
vanish'd,
Conquer'd the soil and fortified the keep,—
No seer foretold the children would be ban-
ish'd,
That a degenerate lord might boast his
sheep.

Come foreign rage—let Discord burst in
slaughter!
O then for clansman true, and stern clay-
more—
The hearts that would have given their blood
like water,
Beat heavily beyond the Atlantic roar.
—ANONYMOUS.

TO MY MOTHER'S MEMORY *

The standpoint of this poem, by Sir William Watson, is a Pennine summit, looking westward toward the Lakeland mountains and eastward over the Yorkshire dales. It is the lowlier dales that command the poet's eye, for there, he tells us, was born his mother, from whom he inherited his poetic vision. This poem is quoted from Hodder and Stoughton's edition of *A Hundred Poems* by Sir William.

THIS is the summit, wild and lone.
Westward the loftier mountains stand.
Let me look eastward on mine own
Ancestral land.

O sing me songs, O tell me tales,
Of yonder valleys at my feet!
She was a daughter of those dales,
A daughter sweet.

Oft did she speak of homesteads there,
And faces that her childhood knew.
She speaks no more; and scarce I dare
To deem it true,

That somehow she can still behold
Sunlight and moonlight, earth and sea,
Which were among the gifts untold
She gave to me.

*Taken from *A Hundred Poems* by Sir William Watson, by courtesy of Dodd, Mead & Co.

THE WARDERS

Rev. George Frederick Scott, Chaplain of the First Canadian Division during the great World War, is the author of this stirring poem of *The Warders*. It rings with a high spirit of deathless endeavor.

ON Vimy Ridge and Passchendael
Our silent armies sleep,
Through Summer's sun and Winter's gale
And 'neath the starry deep;
No more for them the dawn of day,
Nor sunset on the hill,
Their shouts and songs have died away,
Their giant strength is still.

The march of time goes swiftly by
And brings its care and toil,
But in eternal youth they lie
Beneath a foreign soil;
With iron limbs and fire for breath
They charged amidst the gloom,
And shared along those fields of death
The comradeship of doom.

Yet not in vain they watch and wait,
Strong champions of the right,
They are the warders at our gate
And guard us through the night.
From selfish aim and paltry ease,
From slavery of the soul,
The men that save the land are these—
They point us to the goal.

No truer word, save God's, was ever spoken,
Than that the largest heart is soonest broken.
—WALTER SAVAGE LANDOR.

DIAMOND DUST

This fervent love song on a dewy morning is from the pen of a popular English poet and novelist, John Oxenham.

MY Lady walks on diamond dust,
All meaner causeway scorning,
On diamond dust, on diamond dust,
Upon a sunny morning;
On diamond dust because she must,
Since, all for her adorning,
Earth's crust becomes just diamond dust
Upon a sunny morning.

Ten thousand million gleaming eyes
Meet hers with merry twinkles,
And her quick feet with sparkles greet
And tiny rainbow-sprinkles.

And when she climbs the stile to cross
The shimmering, dew-drenched meadow,
Each blade of grass that sees her pass
To kiss her hem flings out a gem,
Which dies in her sweet shadow.

So jewels rare are everywhere
To welcome her sweet passing;
They are, I swear, beyond compare,
All earthly gems surpassing.
And so she walks on jewels fair,
All meaner causeway scorning,
On jewels rare beyond compare,
On every sunny morning.

AN INCIDENT IN A RAILROAD CAR

Poets' praise of other poets has produced many charming and tender verses. There is nothing so humanly attractive as the honest admiration of one genius for another. James Russell Lowell's poem is one of the finest tributes ever paid to Robert Burns.

HE spoke of Burns: men rude and rough
Pressed round to hear the praise of one
Whose heart was made of manly, simple stuff,
As homespun as their own.

And, when he read, they forward leaned,
Drinking, with thirsty hearts and ears,
His brook-like songs whom glory never weaned
From humble smiles and tears.

Slowly there grew a tender awe,
Sun-like, o'er faces brown and hard,
As if in him who read they felt and saw
Some presence of the bard.

It was a sight for sin and wrong
And slavish tyranny to see,
A sight to make our faith more pure and strong
In high humanity.

I thought, these men will carry hence
Promptings their former life above,
And something of a finer reverence
For beauty, truth, and love.

God scatters love on every side,
Freely among his children all;
And always hearts are lying open wide,
Wherein some grains may fall.

There is no wind but soweth seeds
Of a more true and open life,
Which burst, unlooked for, into high-souled
deeds
With wayside beauty rife.

We find within these souls of ours
Some wild germs of a higher birth,
Which in the poet's tropic heart bear flowers
Whose fragrance fills the earth.

Within the hearts of all men lie
These promises of wider bliss,
Which blossom into hope that cannot die,
In sunny hours like this.

All that hath been majestic
In life or death, since time began,
Is native in the simple heart of all,
The angel heart of man.

And thus, among the untaught poor,
Great deeds and feelings find a home,
That cast in shadow all the golden lore
Of classic Greece and Rome.

O mighty brother-soul of man,
Where'er thou art, in low or high,
Thy skyey arches with exulting span
O'er roof infinity!

All thoughts that mould the age begin
Deep down within the primitive soul,
And from the many slowly upward win
To one who grasps the whole:

In his wide brain the feeling deep
That struggled on the many's tongue
Swells to a tide of thought, whose surges leap
O'er the weak thrones of wrong.

Never did Poesy appear
So full of heaven to me, as when
I saw how it would pierce through pride and
fear
To the lives of coarsest men.

It may be glorious to write
Thoughts that shall glad the two or three
High souls, like those far stars that come in
sight

Once in a century;—
But better far it is to speak
One simple word, which now and then
Shall waken their free nature in the weak
And friendless sons of men;

To write some earnest verse or line,
Which, seeking not the praise of art,
Shall make a clearer faith and manhood shine
In the untutored heart.

"FIDDLE-DEE-DEE!"*

Eugene Field's poems about little folks have unfailing charm. In this poem the author is laughing at the "little soldier of four."

THERE once was a bird that lived up in a
tree,
And all he could whistle was "Fiddle-dee-
dee!"—

A very provoking, unmusical song
For one to be whistling the summer day long!
Yet always contented and busy was he
With that vocal recurrence of "Fiddle-dee-
dee!"

Hard by lived a brave little soldier of four.
That weird iteration annoyed him so sore;
"I prithee, Dear-Mother-Mine! fetch me my
gun,

For, by our St. Diddy! the deed must be done
That shall presently rid all creation and me
Of that ominous bird and his 'Fiddle-dee-
dee!'"

Then out came Dear-Mother-Mine, bringing
her son

His awfully truculent little red gun;
The stock was of pine and the barrel of tin,
The "Bang" it came out where the bullet went
in—

The right kind of weapon, I think you'll agree,
For slaying all fowl that go "Fiddle-dee-dee!"

The brave little soldier quoth never a word,
But he up and he drew a straight bead on that
bird;

And while that vain creature provokingly sang,
The gun it went off with a terrible bang!
Then loud laughed the youth, "By my Bottle!"
cried he,

"I've put a quietus on 'Fiddle-dee-dee!'"

Out came then Dear-Mother-Mine, saying:
"My son,

Right well have you wrought with your little
red gun!

Hereafter no evil at all need I fear,
With such a brave soldier as You-My-Love
here!"

She kissed the dear boy. The bird in the tree
Continued to whistle his "Fiddle-dee-dee!"

* From Poems of Eugene Field, copyright, 1910, by Julia S. Field; published by Charles Scribner's Sons. By permission of the publishers.

THE BIRD THAT SANG "FIDDLE-DEE-DEE!"



The gun it went off with a terrible bang, but the bird in the tree continued to whistle his "Fiddle-dee-dee!"

A RED, RED ROSE

This is one of the most beautiful of the many love-songs by Robert Burns. The style is that of an earlier day than his own. There are several versions. The one given here is the form in which it appeared in a Scottish collection of songs to which the poet contributed.

O MY Luve's like a red, red rose
That's newly sprung in June:
O, my Luve's like the melodie
That's sweetly played in tune.
As fair art thou, my bonnie lass,
So deep in love am I:
And I will luve thee still, my dear,
Till a' the seas gang dry:
Till a' the seas gang dry, my dear,
And the rocks melt wi' the sun;
I will luve thee still, my dear,
While the sands o' life shall run.
And fare thee weel, my only Luve!
And fare thee weel a while!
And I will come again, my Luve,
Tho' it were ten thousand mile.

WHAT I LIVE FOR

George Linnaeus Banks, who was born in 1821 and died in 1881, was well known in his day as a poet and a writer. He was a man of lofty ideals, and endeavored by voice and pen to forward the education of his fellow-men. Of his short poems this one is perhaps the best known. It sums up the life-work of the true Christian.

I LIVE for those who love me,
Whose hearts are kind and true;
For the heaven that smiles above me,
And awaits my spirit too;
For all human ties that bind me,
For the task by God assigned me;
For the bright hope yet to find me
And the good that I can do.
I live to learn their story
Who suffered for my sake;
To emulate their glory,
And follow in their wake:
Bards, patriots, martyrs, sages,
The heroic of all ages,
Whose deeds crown history's pages,
And time's great volume make.
I live to hold communion
With all that is divine,
To feel there is a union
'Twixt nature's heart and mine;
To profit by affliction,
Reap truth from fields of fiction,
Grow wiser from conviction,
And fulfil God's grand design.
I live to hail that season,
By gifted ones foretold,
When man shall live by reason,
And not alone by gold;
When man to man united,
And every wrong thing righted,
The whole world shall be lighted,
As Eden was of old.
I live for those who love me,
For those who know me true;
For the heaven that smiles above me,
And awaits my spirit too;
For the cause that lacks assistance,
For the wrong that needs resistance,
For the future in the distance,
And the good that I can do.

THE PASSIONATE SHEPHERD

Christopher Marlowe was born in 1564, the same year as Shakespeare, and died in 1593. He was one of the dramatists who made the reign of Queen Elizabeth brilliant in English history. One of his best poems is *The Passionate Shepherd*. "Madrigals" means songs; a "kirtle" was a kind of petticoat, usually of gay color, fine material and beautiful embroidery, worn above the gown, or dress.

COME, live with me and be my Love,
And we will all the pleasures prove
That hills and valleys, dale and field,
And all the craggy mountains yield.
There we will sit upon the rocks
And see the shepherds feed their flocks,
By shallow rivers, to whose falls
Melodious birds sing madrigals.
There I will make thee beds of roses
And a thousand fragrant posies,
A cap of flowers, and a kirtle
Embroidered all with leaves of myrtle.
A gown made of the finest wool,
Which from our pretty lambs we pull,
Fair lined slippers for the cold,
With buckles of the purest gold.
A belt of straw and ivy buds,
With coral clasps and amber studs:
And if these pleasures may thee move,
Come live with me and be my Love.
The silver dishes, for thy meat,
As precious as the gods do eat,
Shall on an ivory table be
Prepared each day for thee and me.
The shepherd swains shall dance and sing
For thy delight each May-morning:
If these delights thy mind may move,
Then live with me and be my Love.

THE LAND OF THUS-AND-SO *

James Whitcomb Riley wrote charming poems of child life. Nothing could be happier than these verses in which he describes an ideal land where all is right and nothing wrong. The Land of Thus-and-So is all very well to read about—a visit there might bring disappointment.

"HOW would Willie like to go
To the land of Thus-and-So?
Everything is proper there—
All the children comb their hair
Smoother than the fur of cats,
Or the nap of high silk hats;
Every face is clean and white
As a lily washed in light;
Never vaguest soil or speck
Found on forehead, throat, or neck;
Every little crimped ear,
In and out as pure and clear,
As the cherry blossom's blow
In the land of Thus-and-So.
"Little boys that never fall
Down the stairs, or cry at all—
Doing nothing to repent,
Watchful and obedient;
Never hungry, nor in haste—
Tidy shoe-strings always laced;
Never button rudely torn
From its fellows all unworn;
Knickerbockers always new—
Ribbon tie and collar, too;

*From *Rhymes of Childhood*, copyright, 1890. By special permission of the publishers, The Bobbs-Merrill Co.

Little watches, worn like men,
Only always half-past ten—
Just precisely right, you know,
For the land of Thus-and-So!

"And the little babies there
Give no one the slightest care—
Nurse has not a thing to do
But be happy and say 'Boo!'
While mamma just nods, and knows
Nothing but to doze and doze;
Never litter round the grate;
Never lunch or dinner late;
Never any household din,
Pearly without or rings within—
Baby coos nor laughing calls,
On the stairs or through the halls—
Just great Hushes to and fro
Pace the land of Thus-and-So!

"Oh, the land of Thus-and-So!
Isn't it delightful, though?"
"Yes," lisped Willie, answering me
Somewhat slow and doubtfully—
"Must be awful nice, but I
Rather wait till by-and-by
'Fore I go there—may be when
I be dead I'll go there then—
But—" the troubled little face
Closer pressed in my embrace—
"Let's don't never ever go
To the land of Thus-and-So!"

CORONATION *

This poem by Helen Hunt Jackson was written for the purpose of illustrating the ancient truth that an earthly crown may only be a symbol of a slave.

AT the king's gate the subtle noon
Wove filmy yellow nets of sun;
Into the drowsy snare too soon
The guards fell one by one.
Through the king's gate, unquestioned then,
A beggar went, and laughed, "This brings
Me chance, at last, to see if men
Fare better, being kings."
The king sat bowed beneath his crown,
Propping his face with listless hand;
Watching the hour-glass sifting down
Too slow its shining sand.
"Poor man, what wouldst thou have of me?"
The beggar turned, and pitying,
Replied, like one in dream, "Of thee,
Nothing. I want the king."
Up rose the king, and from his head
Shook off the crown, and threw it by.
"O man, thou must have known," he said,
"A greater king than I."
Through all the gates, unquestioned then,
Went king and beggar hand in hand.
Whispered the king, "Shall I know when
Before his throne I stand?"
The beggar laughed. Free winds in haste
Were wiping from the king's hot brow
The crimson lines the crown had traced.
"This is his presence now."
At the king's gate, the crafty noon
Unwove its yellow nets of sun;
Out of their sleep in terror soon
The guards waked one by one.

* By permission of the publishers, Little, Brown & Co.

"Ho here! Ho there! Has no man seen
The king?" The cry ran to and fro;
Beggar and king, they laughed, I ween,
The laugh that free men know.
On the king's gate the moss grew gray;
The king came not. They called him dead;
And made his eldest son one day
Slave in his father's stead.

OLD CHRISTMAS

Mary Howitt has captured in these verses something of the spirit of old-fashioned Christmas—the time of good cheer, good-fellowship and general kindness.

NOW, he who knows old Christmas,
He knows a carle of worth;
For he is as good a fellow
As any upon the earth.
He comes warm-cloaked and coated,
And buttoned up to the chin;
And soon as he comes a-nigh the door
We open and let him in.
We know he will not fail us,
So we sweep the hearth up clean;
We set for him the old armchair,
And a cushion whereon to lean.
And with sprigs of holly and ivy
We make the house look gay,
Just out of old regard to him,
For 'twas his ancient way.
He comes with a cordial voice
That does one good to hear,
He shakes one heartily by the hand,
As he hath done many a year.
And after the little children
He asks in a cheerful tone,
Jack, Kate, and little Annie—
He remembers them every one!
What a fine old fellow he is!
With his faculties all as clear,
And his heart as warm and light,
As a man in his fortieth year!
What a fine old fellow, in troth!
Not one of your gringing elves
Who, with plenty of money to spare,
Think only about themselves.
Not he! for he loveth the children,
And holiday begs for all;
And comes with his pockets full of gifts
For the great ones and the small.
And he tells us witty old stories,
And singeth with might and main;
And we talk of the old man's visit
Till the day that he comes again.
And all the workhouse children
He sets them in a row,
And giveth them rare plum-pudding,
And twopence apiece also.
He must be a rich old fellow—
What money he gives away!
There's not a lord in England
Could equal him any day!
Good luck unto old Christmas,
And long life, let us sing,
For he doth more good unto the poor
Than many a crownèd king!

IT IS COMMON

The anonymous American poet who wrote these lines expresses the thought that the best things of life are really the commonest, if we could only be persuaded of this.

SO are the stars and the arching skies,
So are the smiles in the children's eyes;
Common the life-giving breath of the spring;
So are the songs which the wild birds sing—
Blessed be God, they are common!

Common the grass in its glowing green;
So is the water's glistening sheen;
Common the springs of love and mirth;
So are the holiest gifts of earth.

Common the fragrance of rosy June;
So is the generous harvest moon,
So are the towering, mighty hills,
So are the twittering, trickling rills.

Common the beautiful tints of the Fall;
So is the sun which is over all.
Common the rain with its pattering feet;
So is the bread which we daily eat—
Blessed be God, it is common!

So is the sea in its wild unrest,
Kissing for ever the earth's brown breast;
So is the voice of undying prayer,
Evermore piercing the ambient air.

So unto all are the "promises" given,
So unto all is the hope of heaven;
Common the rest from the weary strife,
So is the life which is after life—
Blessed be God, it is common.

ALL THE CHILDREN

These verses bear no author's name, but are possibly of American origin. Whoever wrote them had a touch of humor and must have loved the little ones, if we may judge by all the pretty things said about them.

I SUPPOSE if all the children
Who have lived through the ages long
Were collected and inspected,
They would make a wondrous throng.
Oh, the babble of the Babel!
Oh, the flutter and the fuss!
To begin with Cain and Abel,
And to finish up with us.

Think of all the men and women
Who are now and who have been—
Every nation since creation
That this world of ours has seen,
And of all of them, not any
But was once a baby small;
While of children, oh, how many
Have not grown up at all!

Some have never laughed or spoken,
Never used their rosy feet;
Some have even flown to heaven
Ere they knew that earth was sweet;
And, indeed, I wonder whether,
If we reckon every birth,
And bring such a flock together,
There is room for them on earth.

Who will wash their smiling faces?
Who their saucy ears will box?
Who will dress them and caress them?
Who will darn their little socks?

Where are arms enough to hold them?
Hands to pat each shining head?
Who will praise them? Who will scold them?
Who will pack them off to bed?

Little happy Christian children,
Little savage children too,
In all stages, of all ages
That our planet ever knew;
Little princes and princesses,
Little beggars, wan and faint,
Some in very handsome dresses,
Naked some, bedaubed with paint.

Only think of the confusion
Such a motley crowd would make,
And the clatter of their chatter
And the things that they would break!
Oh, the babble of the Babel!
Oh, the flutter and the fuss!
To begin with Cain and Abel,
And to finish up with us.

A STORY OF LIFE

Jean Ingelow, the English poet who wrote the famous ballad *High Tide on the Coast of Lincolnshire*, was the author of this plaintive summary of a human life.

SWEET is childhood—childhood's over,
Kiss and part.
Sweet is youth; but youth's a rover—
So's my heart.
Sweet is rest; but all by showing
Toil is nigh.
We must go. Alas! the going,
Say "good-bye."

A VISION OF THE FUTURE

This is an extract from Tennyson's *Locksley Hall*. We hope that the day is not far distant when the poet's vision becomes a reality, when the wonder-ships that can sail the skies have actually come to pass. Perhaps the day may not be far distant when those greater wonders of the poet's imagination may yet be realized.

FOR I dipt into the future, far as human eye
could see,
Saw the Vision of the world, and all the wonder
that would be;

Saw the heavens fill with commerce, argosies
of magic sails,
Pilots of the purple twilight, dropping down
with costly bales;

Heard the heavens fill with shouting, and
there rain'd a ghastly dew
From the nations' airy navies grappling in the
central blue;

Far along the world-wide whisper of the
south-wind rushing warm,
With the standards of the peoples plunging
thro' the thunder-storm;

Till the war-drum throb'd no longer, and the
battle-flags were furl'd
In the Parliament of man, the Federation of
the world.

There the common sense of most shall hold a
fretful realm in awe,
And the kindly earth shall slumber, lapt in
universal law.



The Naked-throated Bell Bird.



The Sulphur Tyrant.

WARBLERS, BABBLERS AND CHATTERERS

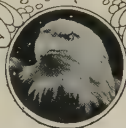
IT is a cold heart that does not thrill in the presence of this group of singing birds to which we come now; a dull mind that is not fired by pleasant fancies as one watches a typical warbler, the Whitethroat. This European bird crosses the continent, goes over the Mediterranean into Africa and back. When he sets up housekeeping in the garden he bullies the owner like a little pickpocket.

There is no note in the gamut of human song sweeter than his warble; but when he scolds, he has a sound which suggests a young frog just come to manhood who is getting his croak into operation for the first time and is not quite sure of the true frog note.

That little war-cry is the white-throat's endeavor to scare us, not only from his nest, but from the beat of territory which he considers his own.

The slender beak is so perky; the head of ashy gray and brown so knowing; the white throat so swollen with happy melody; the white breast tinged with so delicate a rose, as if flushed with the triumph won, that the white-throat is irresistible. The Great Whitethroat is the common species. The Lesser Whitethroat, for some reason, is scarcer. Slightly smaller and more sober in color, it is very

CONTINUED FROM 3140



shy. Only from necessity it comes to shady gardens to clean up the green-fly and caterpillar from the fruit trees and bushes.

Greedy people complain that he has been seen to fill his handsome little beak with a raspberry or two, but for how many raspberries and other fruits have not he and the larger whitethroats prepared a safe way, by gobbling up the insects that spoil the harvest!

Other warblers are: the Alpine, which does not belong to the Alps alone, but is found in Northern Africa and the Mediterranean countries of Europe, as well as in the Canary Islands; the Spectacled Warbler, a timid neighbor of the Alpine, though not accompanying it throughout its range; and the Sardinian Warbler, whose sweet note has a magical beauty in the clear, sunny air of the Riviera, where it thrives abundantly.

It is easily mistaken for the Black-cap, whose sable head it mimics. This warbler is supposed to confine itself to pine woods, in the main; but one has seen it bold and daring, week after week, in a sunny Riviera garden. It sings when other birds are silent, when the amazing high chorus of the cricket and the incredible bass of millions of frogs are the chief elements of melody.

Another warbler is the Orpheus, well

described as a larger blackcap, bigger of build, louder of song, but not so sweet. The Barred Warbler leaves its African quarters late in the spring to make its nest in Europe, but Orpheus has to begin his quest for nursing sites earlier. His mate demands Baltic conditions for her preparations.

THE SWEET NOTES OF A MODEST LITTLE SONGSTER

Matching the lesser whitethroat in size, the Garden Warbler is grayish brown, with an olive tinge above, and has the throat white and the under-parts very light gray or white, with a suspicion of reddish hue along the sides. Timidity has not paid this bird, one fancies; for, though it is an ancient summer visitor to England, it is nowhere common, nowhere plentiful. Would it were, for it has the most charming of songs, which it utters as it lurks in hiding among the foliage.

But the Blackcap makes up by his boldness for the shortcomings of many reluctant members of his order. Audacity pays in his case, at any rate. He and his mate have no sooner arrived in April than they set up housekeeping forthwith; the eggs are laid and the babies hatched. Their feathers grow like magic, and in an astonishingly short time the youngsters are out of the nest, seeing the world for themselves.

A BEAUTIFUL ENGLISH BIRD THAT IS RAPIDLY DYING OUT

One of the rarest of the European warblers is the Dartford Warbler, which someone with a homely fancy has called the Furze Wren. The second name is useful as indicating clues by which we may identify this sprightly little acrobat and singer of the gorse bushes.

One doubts there being any Dartford warblers on the heath which gives the birds their name. Dartford has grown out to the heath, and bird-catchers have villainously thinned out the live stock of the place. Someone who has made a close study of these birds says there are not more than ten pairs in England today, and certainly these little treasures are among the scarcest birds, though their territory used to be fairly widespread in southern England.

Here we are face to face with another of the problems with which Nature has to deal. A few years ago millions of swallows, flying back from Africa, found their

path in the air barred by a great snow-storm. They were too conservative, too wedded to an instinctively followed flight-line to go round, but continued straight on to destruction. There have not been large numbers of swallows in England since, nor, as letters from Africa show us, has the Dark Continent been so favored.

HOW WE CAN SAVE RARE BIRDS FROM PASSING OUT OF LIFE

That is how we suffer from the natural perils of migration. But the English Dartford warbler is a native of England and stays there all the year round as fixedly as the sparrow. In the early Eighties they were affected by a snowstorm as disastrous as that which slew the swallows in Europe. That one storm nearly exterminated the stock. The rarity of the survivors made them more and more valuable to snarers for private cages, and so they have never regained their original numbers.

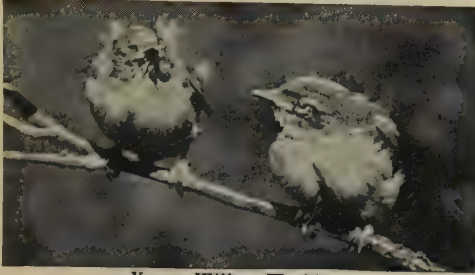
It is all sad and perplexing, but it leads us to a decision in which there can be no error—that the only hope of minimizing the dangers to which birds are exposed is to defend them rigorously when they are with us, to preserve their nesting-places, to guard their eggs and young, and to give the adults the same freedom from capture that we guarantee to lovely rare wild things that grow in our parks and private woods. Then we have done our duty and our best, and Nature must do the rest.

There are some wrens that come in here. The Wood Wrens are warblers, as is the lovely Golden-crested Wren, which we placed with the rest of the wrens. The wood wrens, jolly little singers to whom a coppice is a forest, a thick hedge as a vast plantation, include the cheerful Chiff-chaff, the neat Willow Wren and the Yellow-browed Warbler. This bird is found in the summer in the far north of Siberia. Tree warblers, and warblers of the reeds and of the sedges, lead us on to the Grasshopper Warbler group of perhaps half a score of species. No birds are more difficult to find, for they secrete themselves in heath and moor, and on the margins of thick woods, even straying into dry reeds. And there they utter an unbirdlike chirp, or rapid succession of clicks made by the cogs of a wheel as we wind up a clock.

The fine song of the River Warbler

has been likened to the chirping of the grasshopper; a cry like that of a tree frog is uttered by the Savi's Warbler, common in Holland; a tail like that of a miniature young fan-tailed pigeon naturally gives its name to the Fan-tailed Warbler; and Australians have as logically called a strange warbler of theirs the Pheasant-tailed, in reference to the remarkable development of tail which this little wonder has accomplished.

Their habits vary also. The Water Thrushes (which are true warblers in spite of the name) live in the swamps, as do the Canadian Warbler and Wilson's Warbler. The Pine Warbler and the Bay-breasted Warbler live in the forests. Others like low bushes, and some are often found in the ground. Some are creepers, and some catch flies on the wing. The American Redstart is one of the most beautiful of all, with its mingled



Young Willow Warblers.



Young Swallows in their nest.



The Sand Martin.



Reed Warblers and their young.



Young Goldcrests.



Garden Warbler.



Sedge Warbler.

The Goldcrest of Europe has its rivals in the lovely Firecrest and in the gorgeous Rubycrust of South America, a land to which warblers in general have not made their way.

THE AMERICAN WARBLERS ARE A DISTINCT FAMILY

As mentioned above, the Old World warblers do not visit North America, but this continent has its own warblers, which belong to a different family. There are over a hundred species of them, nearly all more brightly colored than the European, though few sing so well.

plumage of orange, black and white. It is often seen in woodland and shrubbery.

THE FLYCATCHERS OF THE OLD WORLD AND THE NEW

Formerly many widely differing birds were classed as Flycatchers. In fact, almost every bird that catches flies on the wing was called a flycatcher. Now, however, the number of birds so classed has been much reduced. The true flycatchers are confined to the Old World.

Why many species of birds have found their way across the Atlantic to the New World, while others equally competent

have failed to do so, is one of the mysteries of ornithology. We may wonder and wonder without getting any nearer a satisfactory answer.

We know that forms of world-wide distribution did not originate separately in each land. They originated in a common centre, and the Old World types which reached the land of Columbus must have come here æons in advance of him, in days when land bridges linked the north of Europe with America. That suggests how the travelers came, but not why the others did not.

The flycatchers are all weak on foot, though strong on the wing. That is to say, while they perch securely, and spend the greater part of their time on lookout twigs, they are feeble on a level surface. Two species come regularly to England for the summer months, the Spotted, or Gray, and the Pied Flycatchers.

THE QUIET BUT GOOD WORK THE FLYCATCHERS DO FOR MANKIND

The first is a common bird. He is a dull-coated little fellow five and a half inches long, the upper part of the body a uniform brown, with dark pencilings along the centre of the feathers that crown the head, and with the sides of the poll and under-parts of the body a dull white, with grayish feathers mingling in the color scheme of the breast.

"I have never seen a flycatcher," many people say; yet they have seen many in the parks of London, in thousands of gardens, wherever, indeed, evil-working flies congregate. But the stillness of the sober little wonder-worker perched upon his bough renders him so inconspicuous that his image does not live in the mind.

There he rests, mute and inglorious, like a rigid statue of himself, and one would think he had not a pinch of activity in him. But he is all conserved force. He is like a little motor car whose engine is stopped, like a deer which is browsing with mincing gait in safe pastures.

Touch a button and the engine is a thing of power and immense activity; startle a deer and it is transformed into a cyclone on four dainty feet; reveal a fly and the little bird is a flash of sombre feathers launched like a projectile through the air, and there is another fly the less.

These birds are of priceless worth, for they live entirely on insects which are wholly injurious to the human family. They haunt the spots where flies abound,

and with great good sense they put away fear, and come close up to the houses where flies flit to and from open doorways and windows.

THE HANDSOME COUSINS OF THE PLAIN LITTLE FLYCATCHERS

Life is a succession of perchings and pounces for the flycatchers. At every pounce an insect demon of mischief goes to his destiny, and the bird returns to his spray. He makes a little song about it, then relapses into deep contemplation, from which another flying insect, unseen by us, rouses him to lightning activity. The habits of the American flycatchers are similar.

There are beauties in the flycatcher's family: the Red-breasted of Eastern Europe; the Paradise Flycatcher of Asia, whose name denotes its splendor; and Fan-tailed Flycatchers of various species, some white-browed, some white-throated, some entirely black—half a hundred species of these alone. The lovely Blue Wren, so called, of Australia, is really a flycatcher; so is the handsome Gray Warbler of the same region. This bird is the especial victim of the two species of cuckoo found in New Zealand, which leave their eggs to the care of this much-enduring bird.

THE SWALLOW THAT HAS COME IN FROM THE WILD TO LIVE WITH MAN

The weakness of foot which characterizes the flycatchers is still more pronounced in the Swallows, their next of kin. Here the feet are excessively small and weak, well adapted for clinging but not for walking on a level surface. But for the fact that these delightful birds must cling to build and enter their nests, we should imagine their feet to be following the wings of the penguins and the ostriches into the limbo of disuse.

Yet, unlike the flycatchers, they go pretty well everywhere. Even the forbidding Arctic Circle has its summer swallows. That fact alone, if brave men had not been there to see for themselves, would be evidence enough of the existence of insects in the frigid lands. Swallows, needless to say, eat only insects. How could they do otherwise when their business is carried on solely in the air?

The commonest European swallow—Chimney Swallow, as it is named—is a purplish brown above, the forehead and throat chestnut, the breast black with a deep violet sheen, the lower parts mingled

BIRDS OF THE NORTHERN HEMISPHERE (III)



1. Redpoll. 2. European Gull. 3. Black-necked, or Eared, Grebe. 4. Tree Creeper. 5. Lesser Spotted Woodpecker. 6. Capercaillie. 7. European Golden Oriole. 8. Woodlark. 9. Fulmar. 10. Tree Pipit. 11. Corn Bunting. 12. Merlin. 13. Chough. 14. Gull Bunting. 15. Common Sandpiper. 16. European Hooded Crow. 17. Landrail. 18. Manx Shearwater. 19. European Carrion Crow.



1. Crossbill. 2. Herring Gull. 3. Osprey. 4. Gannet. 5. Phalarope. 6. Montagu's Harrier. 7. Wilson's Tern. 8. Hobby. 9. Sandwich Tern. 10. Lesser Black-backed Gull. 11. Yellow Wagtail. 12. Sheldrake. 13. Honey Buzzard. 14. Raven. 15. Red-backed Shrike. 16. Pintail Duck.



1. Dotterel. 2. Whitethroat. 3. Arctic Tern. 4. European Little Owl. 5. Crested Tit. 6. Water Rail.
 7. Great Black-backed Gull. 8. Woodcock. 9. Kestrel. 10. Longtailed Tit. 11. Ring Plover.
 12. Florida Gallinule. 13. European Little Grebe, or Dabchick. 14. Reed Warbler.



1. Razorbill. 2. European Rock Dove. 3. Ptarmigan. 4. Swift. 5. Great Crested Grebe. 6. European House Martin. 7. Garganey. 8. Marsh Harrier. 9. Wryneck. 10. Rock Pipit. 11. Red-Breasted Merganser. 12. Kittiwake. 13. Pied Wagtail. 14. Marsh Tit. 15. Scoter. 16. Spotted Crane. 17. Gadwall Duck.

white and red, the tail long and forked, the wings sharply pointed. Civilization has done well for swallows, let us thankfully note. Originally the bird had his lodging among cliffs and savage rocks, but houses and outbuildings are the foundations of his latter-day home.

He comes north to make his nest on the outer side of the wall, behind which lies baby's cradle. It is with a thrill of delight that we note how fearlessly he comes inland, right into the towns and villages, from his great African journey. He sets up housekeeping beneath the eaves, certain of his welcome, certain of his security, unless some atrocious sparrow has robbed him of his nesting site. What is called a chimney swallow in America is a swift. It really makes its nest in an unused chimney.

How are we to distinguish a true chimney swallow from the equally loved House Martin? From tip to tail the swallow is a good seven and a half inches; the martin is two inches shorter, has the head black, the lower part of the back and the under-side of the body pure white, and the feet and legs feathered like some of the pigeons.

It resembles the swallow, with whom it flies and hunts in joyous company, but we may detect the difference in the slightly inferior flight of the martin; it is not so much a master of wheeling and speed, of direct rush and turning movement. But if it were not compared with its rival, we should rank it a wonder as a flier. Both species are glorious little builders, forming the outer shell of the nest of mud and clay, and lining the interior with soft material, wool and grass.

THE BIRD MINER THAT MAKES ITS HOME IN THE CLIFFS

Sand Martins, or Bank Swallows, are general throughout the greater part of the world. They have never taken to us as the others have, but have clung to the ancient habit of mining homes in the sides of banks and cliffs of sandstones, weak clay and earth. Their works in these forbidding materials are marvels of cumulative force. There can be little strength in the single blow from a sand martin's beak; but blow upon blow, directed with skill and endurance, a few specks, a few grains at a time, they excavate a tunnel from four to six feet and more in the hill-face or the railway-cutting, and that is nursery and sure refuge.

WHY THE EGGS OF THE TREE SWALLOW ARE PURE WHITE

Not all swallows make their nests of clay. The Tree Swallows make their nests of dried grass and feathers in holes in tree-trunks. It is interesting to note that the eggs of the tree swallows conform to the common rule. Birds whose eggs are laid in the open must be colored to harmonize with surroundings so as to be inconspicuous. On the other hand, these birds have eggs which are pure white, like those of the owl and other haunters of holes. They do not need protective coloring, but they must be easily seen in the darkness of the nest. They are white, and therefore instantly seen by the bird returning to its sheltered home.

Our next group comprises the various Babblers, so named from their chattering, babbling song-language. They are all Old World birds. They include thrush-like forms which seem so gay in their language that we call them Laughing Thrushes. There are the Sober-coated Babblers of Abyssinia, whose strange chatter and labored flight from one low-growing bush to its fellow was one of the strange features which awaited James Bruce when he made his great journey into Abyssinia.

THE BEAUTIFUL BULBULS AND THEIR HISTORIC HOMES IN THE NEAR EAST

It is a little perplexing to young students to find green bulbuls, hill-robins, straight-claws and a genus of crow-tits brigaded as merely genera of babblers, and then to be introduced to the true bulbuls as a separate family. At this point relationships are hard to define clearly, and we have space here only to indicate the difficulty. Explanation must be sought in textbooks.

The true Bulbuls are Eastern beauties in which both sexes are alike. They differ in that respect from the Green Bulbuls, where the male is a brilliant bird of predominating lustrous green. The hen is a sober, retiring little bird, difficult to detect among the foliage from which she collects her daily food of insects.

Syria gives its name to a bulbul which thrives also in Arabia, Cyprus, Rhodes and the Cyclades. The White-vented Bulbul warbles over the cradle-site of Cleopatra and stays to-day in the Fayum province of Egypt. This district is a cemetery for the bones of multitudes of

animals now extinct, which have taught us many secrets of past life which would have been otherwise unknown. This bulbul sang over the heads of the men who labored beneath the scorching sun in Fajum. They were trying to piece together from relics there the amazing story of how the elephant got his tusks and trunk, and changed the shape of his head during the age-long process.

If the birds of the Near East could speak a language known to men, what marvels of the past they could tell us! There are so many wonders which we now piece together, a fraction at a time, with infinite pain and labor.

THE SPLENDID COURAGE OF THE TYRANT BIRDS OF AMERICA

Though we said a little while ago that America has no true flycatchers, we have birds quite different in type which we call flycatchers, because they catch all manner of winged insects. Science adopts the name, but corrects itself by giving a subtitle of Tyrant Birds, in allusion to the courage and fighting habits of the tribe. This courage is revealed in the magnificent bravery with which these comparatively small birds unite to attack and drive off birds of prey. They need no man with a gun to help them in their task. They manage the matter so ably themselves that they flourish like the green bay tree, numbering some four hundred species, and myriads of individuals.

Even though we adopt the name of flycatchers, we must remember that they are different birds from the true flycatchers. They are so different that their voice-boxes are entirely distinct from all the perching birds which we have yet considered. We have dealt with birds whose voices are controlled by a complex mechanism, but now we reach birds whose vocal organs are very simple and primitive.

Best known among the tyrant birds is the Kingbird, the supreme challenger of hawks and a glutton for insects. It occasionally takes a bee, and so is hated by some farmers who forget how enormous is this bird's intake of other insects ruinous to crops. The Scissor-tailed Flycatcher has scarlet patches on its sides. The quarrelsome Crested Flycatcher sometimes uses snakeskins in building its nest. There are many other interesting American flycatchers, but we must hasten

on to the Chatterers, a gorgeous family of South American birds, of which one of the most bizarre is the Umbrella Bird, so styled from its crest of straight, elevated feathers, the tips of which gracefully turn to splendid drooping plumes.

A QUAIN T LITTLE BIRD WITH ITS SPLENDID PARASOL

The whole crest can be expanded at will, and forms a noble parasol. Yet the sides of the neck are naked, and, as if to compensate, there descends from the throat a gorgeous lappet of feathers. Next come the Bell Birds, of several species, some of them grotesquely feathered. The notes they utter, one sharp, short note at a time, some sixty to the minute, have been likened to the clear, ringing note struck by a blacksmith upon a mellow-toned anvil.

It is a fact that when there was a bell bird at the London Zoo many thought the sound of its voice was the product of the anvil; and the superintendent of the gardens, worried by the unusual sound, sent with some annoyance to the Zoo blacksmith to know why on earth he was making noise.

The Cotingas, brilliant of hue, solitary of habit high in the tree-tops of the great Brazilian forests, are the nearest allies of the bell bird, and link up with the cock of the rock, a striking resident of Guiana and the Amazon countries. There are allied species in possession of Peru and Ecuador. Brilliant orange red is the dominant note of the feathers, and a wonderful crest surmounts the head and extends to the tip of the beak, overhanging it, but of course not growing upon it.

THE COCK OF THE ROCK, AND WHAT HE SEEMS TO SAY

All handsome birds love to display their fine feathers, and the Cock of the Rock is desirous that others shall be witness of his splendors. So in an open glade he mounts a rock and dances and prances, with proud swayings of the head, and jaunty leaps and struts, and curious cries, as if to say, "See how fine a fellow am I!"

Equal gorgeousness, but a very different outline, marks the Manakins, another South American family. They are handsome, bright little birds, small of beak, small and weak of feet, and with this curiosity, that the two middle toes are united for part of their distance. We cannot say how such a modification has

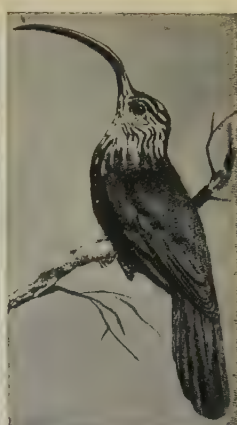
SOME VERY ATTRACTIVE BIRDS



Scissor-tailed Flycatcher.



White-collared Flycatcher.



Brazilian Sicklebill.



White-headed Bell Bird.



Common Manakin.



Sumatran Broadbill.



The Red-billed Hill-robin.

Pictures, copyright, Warne, Bickerton, Chislett, Crook, Symonds, Taylor and others.

come about, nor for what purpose. The feature must have arisen as a freak in the manakin family, and have persisted through the supreme vigor of the line in which it first appeared.

**THE POWERFUL SAW-LIKE BEAK
OF THE PLANT-CUTTERS**

Central America has another curiosity in the Plant-cutters. They are birds with thick beaks with sharp cutting edges, notched in the manner of a saw. This beak is rather a terror to cultivators, for it does not merely cut leaves: it cuts down an entire plant as effectively as a wood-louse in a greenhouse cuts down the baby tomato plant when it is thin and weak, or as a garden slug deals with seedling plants.

An equally remarkable beak is found in Eastern birds, the Broadbills, common to hottest India, Sumatra and Malaya. Their name is well bestowed, for in some species the bill is actually broader than the head! In the Pittas of the Old World we get back to another thrush-like form. They are exquisitely colored birds of the Malay Archipelago. Their habits of life and general outline earn them the popular name of Ant-thrushes.

**THE WONDERFUL FORTRESS OF THE
OVENBIRDS OF SOUTH AMERICA**

Another family awaits to introduce us to the remarkable Ovenbirds of South America. They are among the master-builders of the world. Their home is a fortress of mud, a foot and more in diameter, built with an outer surrounding wall with a narrow entrance, but with one end of the wall turning inward as a defense. Within there is an inner room, to which a small opening gives access from the outer defenses.

Many weeks may go to the making of these nests, for the birds cannot work except when moisture and mud are available, and that is not always the case in tropical America. It is interesting that these fortress-builders like the company of men and choose human habitations for their sites when possible.

When they build in the open country, they take up their positions by the side of a road and make the entrance face the highway. There must be a long history of native kindness behind these habits. What we call an ovenbird in North America is a warbler.

Spinetails are so named from the rigid,

pointed tips of the tail feathers. This and the Sicklebill, a bird with a bill long and curved like a reaper's implement, lead us to the extraordinary Lyre Birds of Australia. They have developed in a unique manner, in the great island continent, and stand alone in the grace and splendor of their tails.

Extravagant grace could scarcely go farther than in this family. The feathers of the tail take the most beautiful outline, differing in varying species, yet all with the general shape of the lyre. Here, again, we find gay birds gay in habit. They are capital songsters, and as they sing they dance. They seem to display a real greed of admiration. But they have good hearts as well as giddy brains. No bird shows greater devotion to its young than the frivolous lyre bird.

Nothing but fatal illness will make the parents desert eggs or babies. Even if the little ones are carried away, the parents will follow, if possible, and continue their duty to the chicks in another place. When young ones have been taken away, and are afterward restored to the nest, the mother welcomes back her lost ones with lavish affection. And that is more than the great wise mother elephant will do to a strayed baby of hers that finds its way back home.

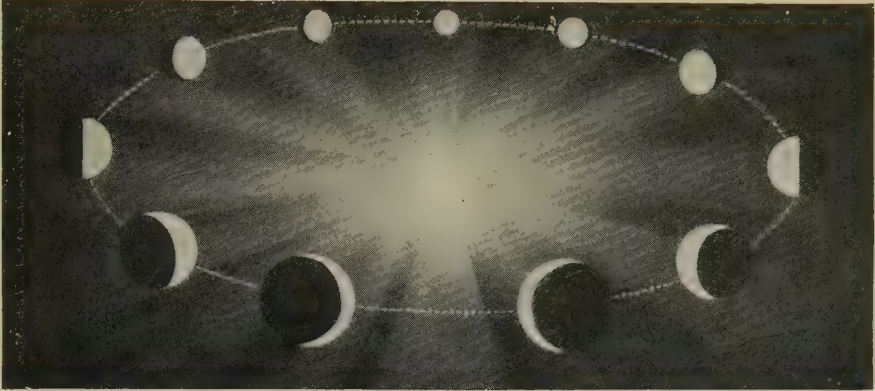
**THE IMPORTANCE OF BIRDS TO THE
PROSPERITY OF THE WORLD**

What a list of birds we have now run through together in this story! Except the plant-cutter, there is not an enemy in the whole vast company. But there are friends beyond price on every page. It is only when we take such a survey that we gather any estimate of worth as to the real value and importance of birds to the prosperity of the world.

Some time ago a scientist estimated that one-fifth of our crops is destroyed by insects, and warned us that man is fighting a losing battle with these small enemies. The best aid in the fight is the great company of birds. If we destroy our allies, the battle is likely to go against us, and we shall have for our own use a smaller part of the crops.

Strike out this group of birds of which we now take farewell, and life would be harder for mankind in many places, and apart from economic values, it might even be said to be shorn of half its beauties and half its joys.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 3365.



The orbit of Venus as seen from the earth, showing the apparent changes of the planet.

THE INNER PLANETS

MERCURY, VENUS AND MARS

THAT early morning beam of light which falls upon us from the sun has lighted up many strange things in its eight-minute journey, and has pried out secrets which we on earth can only guess at. When the beam has been traveling between three and four minutes it lights up a planet not unlike a miniature earth, which is known as Mercury. Mercury is a planet which is rather difficult to see with the unaided eye. It is so near the sun that the glare obscures our vision of it even in the best telescopes, but much has been found out about it, though much is still doubtful.

What we know of it makes it one of the most puzzling planets to the astronomers. It is known, for example, that it takes 88 days to travel round the sun, so that we say its year of winter, spring, summer and autumn is only that length, instead of the 365 days of our year. It is known also that Mercury travels round the sun in a path that is far from circular, but made like an egg, an oval, an ellipse. When we say that the beam of light takes between three and four minutes to reach Mercury from the sun we speak with more accuracy than at first appears, for Mercury is not at all times



the same distance from the sun, and the beam's journey is sometimes longer, sometimes shorter.

At its farthest distance, or *aphelion*, Mercury is 43 million miles from the sun; at its shortest, or *perihelion*, it is only 28 million miles away. The path of Mercury round the sun is not always the same shape. Like the paths which all the planets follow, it slowly and regularly alters, and then changes back again. The reason for the change is that all the planets are tugging at one another with the mysterious force of gravity. When they are near one another they pull more; when far away they pull less. So these regular changes occur in all their paths. There is a difference, however. In all the other planets, little and big, near and distant, the changes in the paths can be accounted for; some of those in Mercury's yearly tour have continually defied the calculations of the astronomers.

This rather difficult question is mentioned here because many astronomers once believed that there might be a planet even nearer to the sun than Mercury. They supposed that this body was pulling it out of its proper path. So strongly was this believed that

the unknown planet was given a name, and Le Verrier, the French astronomer, who helped to find the outer planet Neptune, calculated what ought to be the size and movements of this imagined world. Afterward quite a number of watchful observers in the last half of the nineteenth century thought they had caught a glimpse of it. But its presence was never proved, and now there are very few who think it exists. Meanwhile, the mathematician Einstein has found a new explanation for one portion of Mercury's behavior.

Not everyone agrees with Einstein, but more people believe the explanation he offers than believe in that strange undiscovered body to which the name of Vulcan had been given by Le Verrier.

If such a body had existed it would have been about the size of Mercury, which is not very large. It is less than three thousand miles in diameter, and is not so heavy, bit for bit, as the earth. The earth is about five and a half times as heavy as water, whereas Mercury is only about three times as heavy as water.

We spoke of the seasons of Mercury, but we cannot speak with certainty. The earth, spinning like a top which leans to one side, turns round once in twenty-four of our hours, and does so some 365 times in one of our years. Some astronomers have thought that Mercury, which spins more upright than

the earth, turns round once in a very little more than twenty-four of our hours, and therefore 88 times in a year of Mercury—that is to say, in the time Mercury takes to get right round the sun. But it is more likely that Mercury has

a day which is so long that it lasts for the whole of the 88 earthly days of its journey round the sun. The consequence of this would be that Mercury always presents the same side of itself to the blaze of the sun, just as the moon always shows the same face to the earth. The face

shifts a little, so that the sun sometimes sees a little more to the one side or the other, but in a general sort of way the torrent of the sun's rays falls on a scorched face of dark rock, rugged and mountain-

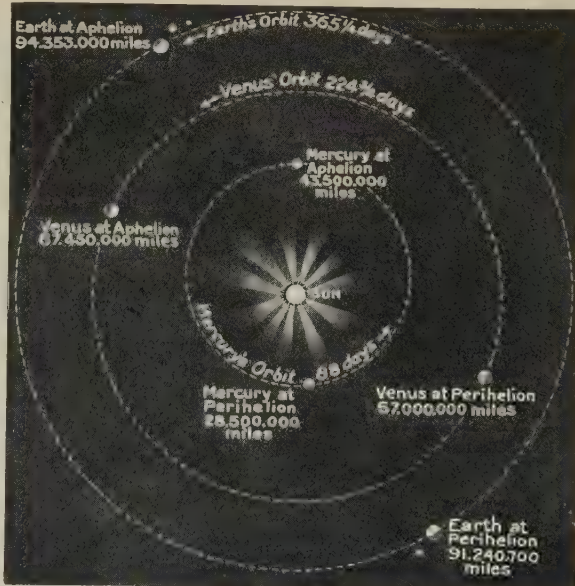
ous, with some peaks higher than any on the earth, but with no water. It is, and always has been, a dead world. What it has on the side which is sunk in perpetual night because it is forever turned away from the sun, not even the traveling beam of light could tell us.

The light-journey from Mercury to Venus does not take very long, between

two and three minutes. Venus, traveling round the sun in a path that is very nearly a circle, is an average distance of 67 million miles from the sun, and it performs the round trip in 225 of our days. Here, again, we have to speak of the planet's travels in terms of our days,

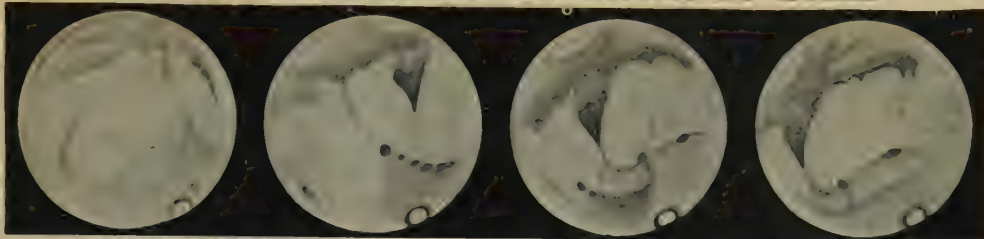


Mercury as we see it at its greatest, its medium, and almost its least distance.



The orbits of the earth, Venus and Mercury.

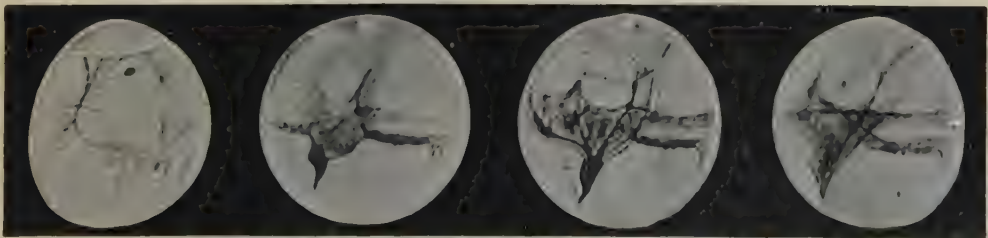
WHAT THE FACE OF MARS IS LIKE



Changes on Mars in one month, supposed to be due to clouds, and therefore to water.



Map of Mars made from many separate photographs.

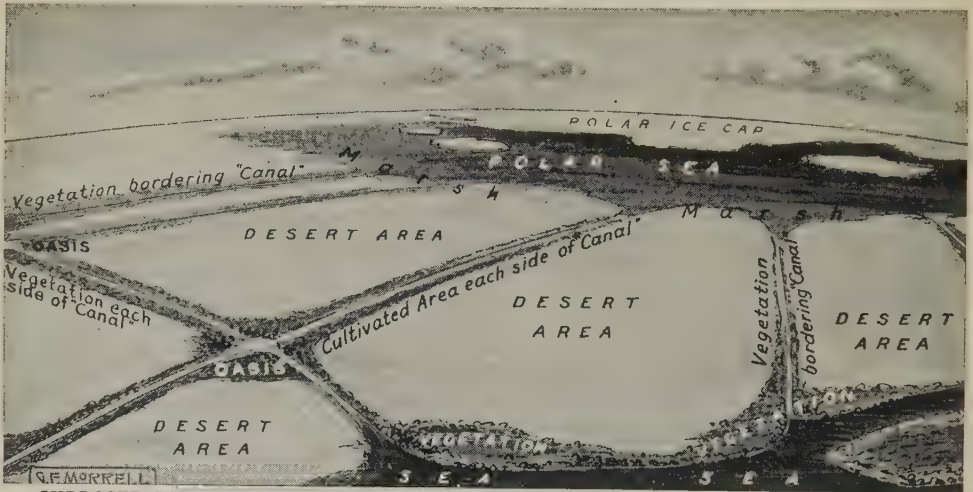


Melting snow on Mars, and the appearance of dark areas supposed to be vegetation. The changes observed in the bottom picture were spread over five months, and Professor Lowell declared them to be due to the melting of snow and the running of the water down the canals, causing vegetation.

not of its own, for there is still some doubt as to how long the day of Venus really is. Some astronomers cling to the old view that this planet is spinning as fast as the earth, but more think that it has a turning movement like that of Mercury, but even slower, for the turn takes the whole of the year of 225 of the earth's days. Consequently, as in the case of Mercury, one side of Venus always faces the sun and one is always in cold and darkness. But what that face which turns to the sun is like, we know not. It might be like the face of the earth, seamed with mountains and valleys, bright with oceans and rivers, for Venus is little smaller than the earth, and very nearly as heavy. But all that is lighted up for our gaze

tween the earth and Mars would take only two and a half minutes. But even that is a very long way—35 million miles, in fact; and when the earth's astronomers look at Mars through the best telescopes, and from high mountains where the air is very clear, all they see is a disk much smaller than a ten-cent piece and hardly larger than the top of a tin-tack. But for many years astronomers have peered at this disk, and made drawings of it, and taken photographs. Some of them have seen blots and lines on it, even clouds moving across it; and several, like the astronomers who thought they saw the planet Vulcan, have found what they expected to see.

The most curious things they have



SUPPOSED CANALS AND DESERT SPACES THAT SOME PEOPLE IMAGINE TO BE ON MARS

is a surface as white as snow on which are still brighter points and patches, which some have thought to be snow peaks of immense height peering through a covering of cloud.

The sunbeam glancing from Venus and passing the earth goes on its way to that one of the earth's neighbors which is farther out in space. Though it is not so near as Venus, it offers itself more frankly to our gaze—the planet Mars. Like Mercury, it travels in an oval path round the sun, sometimes as much as 155 million miles away, sometimes as little as 128 millions. When at the smaller distance, the sunbeam would take about ten and a half minutes to reach it; so that if the earth were on the same side of the sun on its annual journey at that favorable moment, a light signal flashed be-

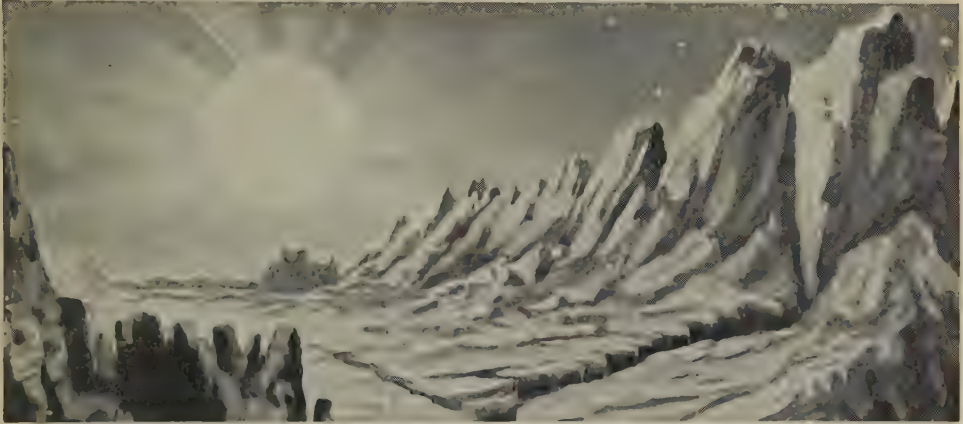
found are lines on the disk which must be hundreds, or even thousands of miles long. They appear to join up two dark parts in a regular manner; and some who have looked at them have sometimes imagined that they see double lines. It has been argued that these strange lines are not great volcanic cracks on the planet's surface, but canals. It is suggested that these waterways convey water from the great black patches, which may be huge shallow oceans or lakes, across the sandy red deserts of Mars; or that they bring down water when the sun's heat in summer dissolves the snow.

All that can be said without contradiction is that, although Mars seems like the earth, it is in fact very different. It has an atmosphere, as the earth has, but a very much thinner one; and that is why

THE INNER PLANETS

we can see the surface so plainly and make certain, by watching the markings, that Mars spins round in a day very much like our own—a day of 24 hours, 37 minutes, 22.67 seconds, to be exact. It is possible that there is life on Mars, but it is certain that human beings as we know them could not live or breathe there. Mars is probably much colder than the earth. It is a much smaller

patches on Mars, as big as Europe, which are not desert, and may be lakes or bogs, and if so, there is water and there is snow, though the snow seems to come and go far more quickly than on earth. If there is water, then there may be vegetation, and it may be that the lines which appear on Mars are the sign of the coming of spring on that planet, when all the plants begin to grow as the snows melt.



What astronomers imagine the face of Mercury to be like—a scorched and rugged surface with very high peaks and no water.

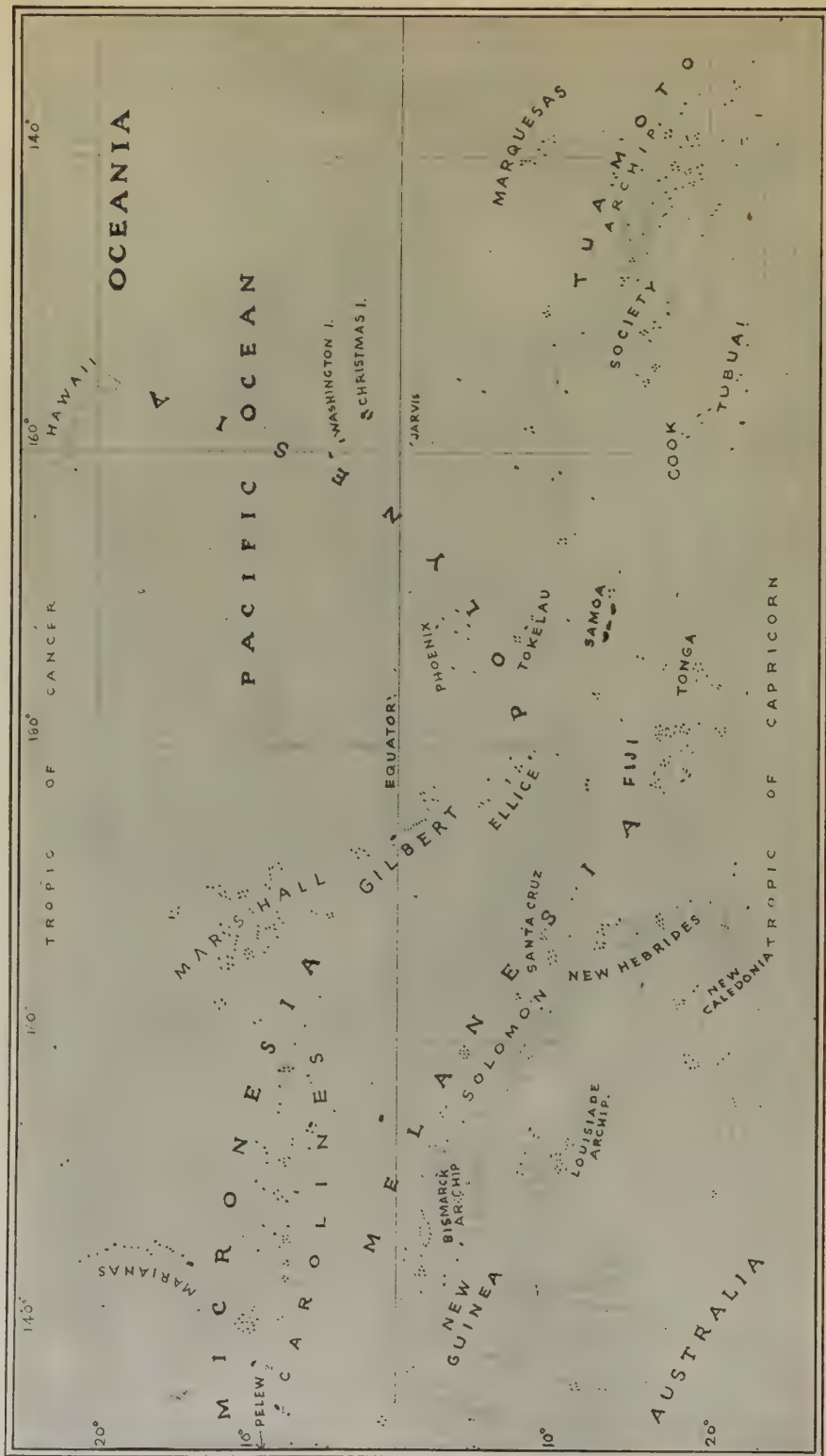


Venus is believed to possess a cloud-laden atmosphere and very high mountain peaks. The sun appears much smaller in the sky of Venus than it does in the sky of Mercury.

planet, little more than half (4,200 miles) the earth's diameter, and much lighter. Consequently, every object on Mars, a book or a cork, would weigh very much less there than here. So would the atmosphere itself, and so would the clouds in it. Enormous clouds seem sometimes to hover over Mars, twenty-five to thirty miles in height. They may not be watery clouds at all, but merely dust storms slowly moving over yellowish or reddish areas. But certainly there are great

We have some certain facts to add to our certain knowledge, such as that the year of Mars is equal to 686 of our days, and that it has two tiny moons, one only six or seven miles in diameter (Deimos), and the other (Phobos), which is the inner one, only nine miles. Deimos flies round its parent planet in thirty hours, though it is 12,500 miles away, but Phobos, only 3,700 miles distant from Mars, performs its journey every seven and a half hours.

THE NEXT STORY OF THE EARTH IS ON PAGE 3409.



ISLAND GROUPS OF THE SOUTH PACIFIC OCEAN



A village built on piles, off Admiralty Islands, in the Bismarck Archipelago.

ISLANDS OF THE SOUTH PACIFIC

IT seems strange, as we look backward over the history of the last four hundred years, that so many lands were discovered by accident. When daring explorers were looking for India, they found the West Indies, North America and South America. These lands were wonderful, but they were not India. The hope of sailing from Europe to India did not die, and many of the explorers and settlers of North America spent much time in seeking a passage to India. When Vasco Nuñez de Balboa, a reckless Spanish adventurer, crossed the Isthmus of Panama in 1513 and sighted a great sea to the westward, the news brought joy to many sailors. The man who first sailed this sea was Magellan, a Portuguese. In 1520 this courageous captain sailed around the tip of South America, through the strait now called Magellan, and out into the unknown ocean. After sailing for many weeks over its calm waters he called it *El Mar Pacifico*, meaning "the gentle sea." Ever since that time the ocean has been known as the Pacific. Magellan was the first European to sight any of the thousands and thousands of islands, big and small, which we now call the South Sea Islands, Oceania or Oceanica.

CONTINUED FROM 3191



Before we continue our story of these islands we must have our maps of the Pacific Ocean in front of us. The Pacific Ocean covers more space than that occupied by all the land surface of the globe, so we should be hopelessly at sea if we did not have our maps. First of all, we must find the dotted lines which are marked "Tropic of Cancer" and "Tropic of Capricorn." Between these lines we shall find nearly all the islands of Oceania. Now, if we look very carefully, we shall find, south of the Tropic of Capricorn and very far east, a lonely dot with the strange name Easter Island. That little spot is the most easterly point of Oceania. The most westerly islands we shall look for are those in the waters which wash the eastern shores of Australia, New Guinea and the Philippine Islands.

At first glance it seems that it will be very difficult to find any one name or island among so many. But a second look shows that Oceania is divided into three large groups of islands: Melanesia, Micronesia and Polynesia. These names seem very terrifying, but their meanings are easy to remember. Melanesia means "black islands," and the name was given to the islands in the group because the natives were of the black

race. Micronesia means "small islands," and the islands in this group are all small. Polynesia means "many islands." A glance at the map will show that Polynesia has more islands than the other two, and it is much more spread out. The natives of the last two groups belong to the brown race.

EARLY DISCOVERERS OF THE SOUTH PACIFIC ISLANDS

Magellan did not discover all the islands in Oceania, but he did see a great many. He stopped at the Marianas, in the Micronesia group, and thence sailed to the Philippines, where he was killed fighting the natives. Although Sir Francis Drake sailed around the world in the sixteenth century, he did not make any astounding discoveries in the Pacific. For a hundred and fifty or more years the Spaniards and the Portuguese sailors did practically all the exploring. Later the English, French and Dutch sea-captains began to compete with the Spaniards.

Every boy and girl will be interested in one English buccaneer and explorer who sailed the Pacific Sea—William Dampier. In 1703 he set out from England for the South Seas with Alexander Selkirk as his sailing master. Trouble arose on the journey, and Selkirk was put ashore on the island of Juan Fernandez, west of Valparaiso. There he stayed for four years and four months, and the whole world knows his story because Selkirk was the original of Robinson Crusoe.

A Dutchman, Jacob Roggeveen, landed on Easter Island in 1721, but the most celebrated voyages of that period were those of Captain James Cook. Captain Cook had already won fame by being the first man to cross the Antarctic Circle, but he made three noted voyages in the South Pacific. Unfortunately he was killed when a landing party was overpowered by natives on one of the Sandwich (now the Hawaiian) Islands. There were many brave men to follow his lead, and during the next hundred years practically all the islands were visited.

Whalers, sealers, traders, missionaries and pearl-fishers came to the islands in the wake of the explorers. There was much wealth to be found in trading in trepang, copra, pearls, tortoiseshell and other island products. Trepang is a sea slug which the Chinese use to make soup, and copra is the dried kernel of

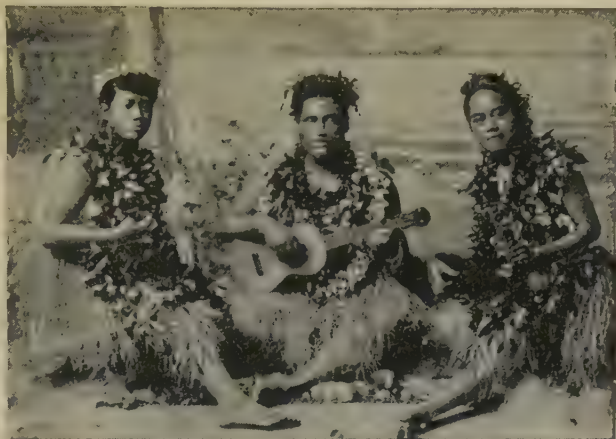
the coconut. Many of the white traders were men of bad character, convicts escaped from the penal settlements and runaway sailors. These men not only cheated the natives but cruelly ill-treated them. They became notorious under the name "beachcombers," and were known as men who would stop at nothing to make money. One of their worst practices was the kidnaping of natives to work in South America and Australia. Soon the islanders began to suspect all white men and to fight them whenever possible. Not only did they kill them but they ate them as well, for the greater number of the savages were cannibals. Good traders and missionaries suffered the same fate as the bad whites. The savages were suspicious of them all.

TWO TYPES OF ISLANDS—CORAL AND VOLCANIC

We must go back to our map again to look at the three large groups of islands in Oceania. Under the name Polynesia come the smaller groups—Hawaii, America Islands, Cook Islands, Ellice Islands, Manihiki Islands, Phoenix Islands, Pitcairn, Tokelau Islands, Tonga Islands, Samoa, the Marquesas, the Paumotu (or Taumotu), Society Islands, Tubuai Island, Wallis Archipelago, and other groups too small to mention. Not only Polynesia but all the islands in Oceania may be divided into two kinds. One kind was formed by volcanoes and the other by coral. Some movement under the sea heaved up the volcanic islands, but the others are made of the hard skeletons of the tiny sea creatures. Sometimes platforms of coral were built out from the shore of an existing island, and these were called coral reefs. Sometimes the little creatures built almost perfect circles or rings. These are called atolls, and the water inside the ring is called a lagoon.

In the course of ages sand and soil blown by the wind from other lands covered both coral and volcanic islands. Then trees and plants began to grow. On the very low coral islands these trees and plants do not thrive very well, but on the other islands the growth is marvelous. Oranges, pineapples, guavas, bananas, custard apples, mangoes, coconuts, yams, and breadfruits can be had for the picking. Bright-colored flowers add an air of gaiety to the rich luxuriant covering of ferns and mosses.

PEOPLE AT THE OTHER SIDE OF THE WORLD



Native musicians of Hawaii, in the Sandwich Islands.



A man of the Solomon Islands.



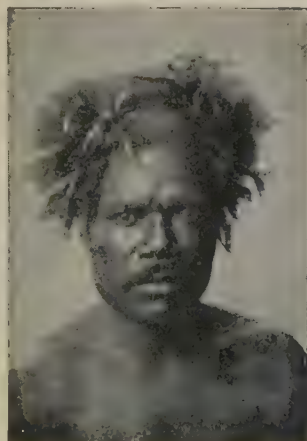
A Solomon Islander.



A young lady of Tonga.



A Maori chief.



A native of Fiji.



A group of well-to-do young ladies of Tahiti.

These are types of the people who live in the many islands of Polynesia, Micronesia and Melanesia in the South Pacific. Some of them are British citizens; some are French, and some are American. They were all savages, and many of them were cannibals until missionaries carried the Gospel to them and educated them.

Photos, Underwood & Underwood, London; Mr. N. P. Edwards, Littlehampton.

In contrast to the abundance of plants one remarkable feature is the absence of land animals. There are rats and bats, pigs and lizards, but of other creatures there are few. Birds are more numerous, especially pigeons and doves, and there are many kinds of insects, including the malaria-carrying mosquito. Fish are as plentiful as animals are scarce, and vary in size from huge whales to the tiny sea creature that looks like a flake of gold. The fish of the South Seas are famous for their gorgeous coloring. Crocodiles are common, frequenting sea-coasts and mangrove swamps. Sharks are too plentiful for comfort in these warm waters.

A N EARTHLY PARADISE WHERE FOOD GROWS ON TREES

The climate is so mild that until the white man came a native wore practically nothing except a cloth around the waist. There is a rainy season, but there are months of cloudless blue skies matched in color by the blue of the Pacific. Travelers have called the South Sea Islands an earthly paradise. They must have been that for the natives until the white man came. Think of lands where food was to be had for the picking and no one had to work to buy clothes or to buy fuel to heat houses!

The Polynesians were not always a savage people, for there are traces of a considerable amount of civilization in their legends, manners and customs. But for some unknown reason they have deteriorated. Physically they are a very fine race. They are very tall and well built. Their skin is light brown, and their hair is brown or black but never kinky. Men and women alike are very clean in their habits, and love bathing. Among them are found some of the finest swimmers in the world. In disposition they are cheerful, shrewd, intelligent, and they possess much common sense.

The men are noted for being daring and skillful sailors. Like white men, they have their own games, and enjoy boxing, wrestling, canoe and foot races, swimming, archery, fishing and, indeed, all pastimes that white men like. But as the climate is mild and food is had easily, they do not care for work. One peculiarity they have is the habit of tattooing their bodies. Another very bad habit they had formerly was that of eating the enemies they killed. It has been said

already that the Polynesians do not like work, but the women always worked enough to provide their scant clothing woven from bark fibre and to make fishing-nets. The men made canoes and their own dwellings, as well as their tools for fishing and weapons for warfare. It is a sad fact that since the coming of the white man this splendid race is gradually dying off.

W HERE ROBERT LOUIS STEVENSON LIES AT REST

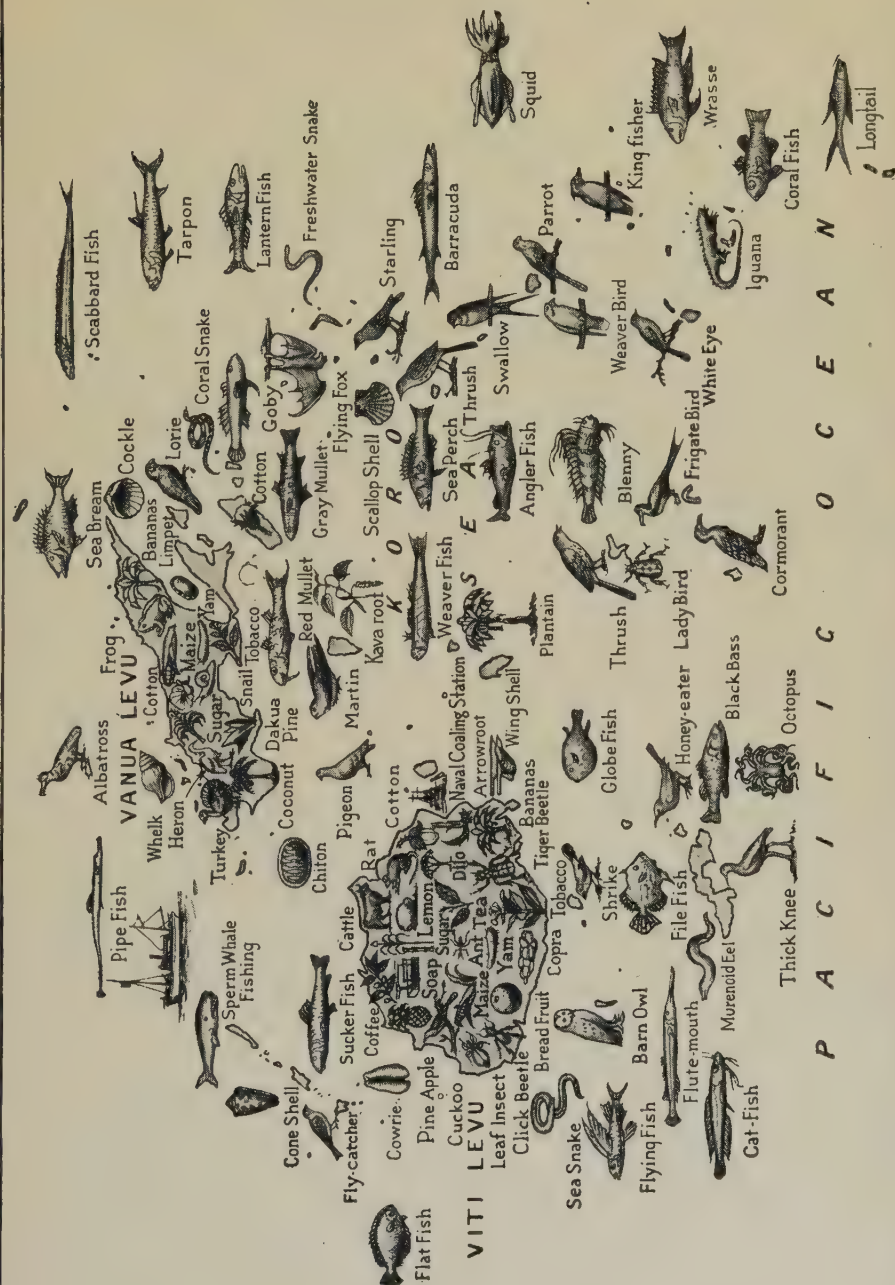
Although the Spaniards and Portuguese were the first to sail the Pacific Seas and to discover the South Sea Islands, yet to-day Spain does not own a single coral island in the Pacific, and Portugal has part only of an island in the Malay Archipelago. Since Germany lost her South Sea possessions to New Zealand in the World War, the islands of Polynesia fly the flags of three nations, the British, French and American. Hawaii and part of Samoa are ruled by the United States. The Marquesas, the Paumotus, the Society, the Tubuai and the Wallis Islands belong to France. The other islands are British. It was the New Zealand Expeditionary Force that captured the German part of Samoa on August 30, 1914. No boy or girl who has read *Treasure Island* or *A Child's Garden of Verses* will forget that on the top of Mount Vaea, overlooking Vailima and Apia, on Upolu of the Samoan group, is the grave of the well-beloved Robert Louis Stevenson. This gifted writer understood the Samoans, and they loved him and made him a chief. It was in the beautiful surroundings of the Samoas that he wrote many of the books which have delighted men and women and boys and girls throughout the world.

Easter Island, which was so named because the Dutchman Roggeveen landed on Easter Sunday, 1722, has a very strange secret. On this tiny island two thousand miles from Chile, to which it belongs, and a thousand miles from the nearest Polynesian neighbor, there are remarkable stone walls and huge statues from twelve to thirty-three feet in height. No man knows who carved these ruins and figures. Easter Island keeps the secret of its own mystery.

T HE STRANGE STORY OF PITCAIRN ISLAND

Pitcairn Island has a curious history. In 1790 some of the crew of H. M. S.

FIJI, WITH ITS ANIMALS AND PLANT LIFE AND ITS THRIVING INDUSTRIES



There are 250 islands in the Fiji group, with an area of 7,083 square miles. They are of volcanic origin and are bounded by coral reefs.

Bounty mutinied. They overcame the officers and other sailors and set them adrift in small boats. Then, steering for Pitcairn Island, of which they had read, they ran the Bounty on shore and burned her. They had taken some native men and women from Polynesian islands, and a little colony was formed. For eighteen years no one found their hiding-place, and then all the mutineers but one were dead. But their children were living. Twice the British Government has tried to get those descendants of the mutineers to move from the island. In fact, the Government moved them against their will. But some curious homing instinct takes them back. Now descendants of the Bounty mutineers are divided between Pitcairn and Norfolk Island, tiny spots three thousand miles apart.

The Island of Hawaii is another point of interest, because there we find Kilauea, the world's greatest active crater. For years the volcano has behaved itself, and travelers drive over the floor of the main crater and within a hundred feet of the living fire-pit. But at times the display of volcanic fireworks is awe-inspiring.

DIVERS DO NOT NOW KILL OYSTERS TO GET PEARLS

In the Paumotu group there are certain pearl beds which produce very fine gems. These beds are under the control of the French Government, and diving is restricted to a few months each year. In the old days divers roughly opened the oyster-shells, and after taking a pearl, left the oyster to die. But now the shell is opened very carefully, the diver slips his hand in and feels the soft oyster gently to locate the pearl. Then the oyster is carefully let down into the sea again, where it can go on producing pearls. The old way of letting the oysters die promised to denude the oyster beds of the pearl-makers.

Coconuts are the chief product of the America Islands. Sometimes we do not realize how lonely the South Sea Islands may be. But in 1919 a British warship found on Christmas Island, one of the Americas, three men who did not know the World War was over!

It would be possible to tell interesting stories about each of the islands in the Polynesian group, but before we pass on to another division of Oceania, it is right to note how one man is remembered in Polynesia. That man is Captain

James Cook. Cook Islands, Society Islands (named for the Royal Society), Sandwich Islands (or Hawaii), Friendly Islands (or Tonga) and Savage Islands (or Niue) still retain the names he gave to them.

Northwest of Polynesia lie the scattered groups of Micronesia—Gilbert Island, Caroline Islands, Mariana Islands, Marshall Island and Pelew Islands. The description of the Polynesian group fits the Micronesian and Melanesian groups, but the inhabitants are not quite like their Polynesian brothers and sisters. The difference is seen in looks, language and customs. Micronesians look more like Malays, and seem to have come from a mixture of races. Indeed some of them have the slanting Mongolian eye. In color they are brown, but darker than the Polynesians, and their hair is straight, black and lanky. The Marshall Islanders are the boldest and most skillful sailors in the Pacific. They start out in great outrigger canoes and spend months sailing between the islands. On such trips the provisions are brought along, but for drinking water rain is depended upon. To guide them they make a sort of chart of sticks tied together to show the positions of the island and the direction of the winds and the currents. In their speech the Micronesians use a great many Malay words. There is a difference in religion, too. Polynesians worship many gods, but they have one, Tangaloba, that is father of all gods and creator of all things. With the Micronesians, worship of their ancestors overshadows the worship of gods.

MICRONESIA, WHICH HAS HAD MANY OWNERS

The houses in Micronesia are much more primitive than Polynesian dwellings, for they are made of a thatched roof resting on posts or blocks of coral about three feet high. The floor is at that level and is reached from an opening in the centre. This shelter serves as a sleeping place and as a storehouse safe from rats, which overrun all these islands.

The Micronesian islands have changed ownership several times. Magellan discovered the Marianas (or Ladrões) in 1521. Spain kept them until 1898, when, together with the Pelews and the Carolines, she sold them to Germany. Germany lost them to Japan in 1914. Guam, the largest and most important

WORK AND PLAY IN THE SOUTH PACIFIC



Surf-riding as it is done in the South Pacific Islands is one of the most glorious sports known to man. The natives swim away out with their surf-boards. Then, catching an incoming wave, the board races shoreward at the rate of a mile a minute.

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Pineapple-growing is one of the chief industries in Hawaii, one of the South Pacific Islands. Here natives are shown weeding among the rows of pineapple plants on a large plantation. The pineapple itself grows in the centre of the sword-like bunch of leaves. Some of these plantations extend for miles.

island in the Mariana group, was seized by the United States when the Spanish-American War broke out, in 1898. Japan took the Marshall group from Germany at the outbreak of the World War. The Gilberts belong to the British Empire.

Magellan discovered the Mariana Islands in 1521, and gave them a name which means "Islands of the Lateen sails," because he had been greatly impressed with the native canoes sailed with a triangular bit of matting. But his men, enraged at the wholesale thieving done by the savages, called the island "Islas de Los Ladrones," which means "Isle of Thieves." And that name, Ladrones, is still used as much as is the official name, Mariana.

The Carolines, like Easter Island, possess massive ruins, of which the story is lost. Hundreds of acres are covered with the remains of walls, canals and earthworks huge in size. The blocks of stone in the walls could have been lifted into place only by machinery of some sort. But what machinery was used and who were the ancient builders, no one can tell.

The Marshall Islands were a great gathering place for whalers in the olden days. But the natives suffered, for the white man's diseases spread to the brown race and took terrible toll.

The Pelew Islands are well wooded islands, lying inside a coral barrier reef. They have a healthy climate and a good water supply. The natives are short in stature, as a rule. Glass and enamel beads are still used as money among the islanders. In 1914 Japan took the Pelews from Germany.

The Gilbert Islands have the greatest population in proportion to size of all of the Micronesian group. The land area of the islands is only 166 square miles, while the population numbers over 30,000. The Gilbert men are tall and well made. They are nearly always without clothes, but they like to wear conical hats of pandanus leaves. In war their chief weapon is a sword edged with shark's teeth. John Byron discovered these islands in 1765. They were visited and named by Captains Gilbert and Marshall in 1788.

THE LAND OF THE "WOOLLY-HAIRED" BLACK RACE

The last division of Oceania, Melanesia, lies south of Micronesia, and includes Fiji, the Louisiade Archipelago,

Santa Cruz Islands, Solomon Islands, Loyalty Islands, New Caledonia, Bismarck Archipelago and the New Hebrides. All the Melanesian peoples have characteristics which distinguish them sharply from the inhabitants of Polynesia and Micronesia. Their civilization is lower. They are black in color and resemble the lower African negro. They have broad noses, thick lips and fuzzy curly hair. The Melanesians were the most notorious cannibals and head-hunters in the early days of exploring in the South Seas. They are not as intelligent as the natives of the other groups, and they have earned a bad name through their treachery.

Another name for this black race is Papuan, which means "woolly-haired." It is believed by some scientists that this people once lived in Africa, but how they came to land in the South Seas is a mystery. They have kept the old negro belief in omens and sorcery, and have a great dread of departed spirits. Self-inflicted scars often take the place of the tattooing of the other South Sea races. One characteristic of theirs is very strange to white travelers, and that is the delight Melanesian men take in "dressing up." A Papuan man will wear necklaces, armlets and earrings of shells, teeth, fibre or feather. Sometimes he wears a flower, a piece of bone or a feather in his nose. On festal occasions his hair will be greased or stiffened with mud until it looks like a mop, in which are stuck feathers and flowers.

THE WONDERFUL CLIMATE OF THE FIJI ISLANDS

Most of the islands in Melanesia are under British control, but the Loyalty Islands and New Caledonia are under the French flag. The New Hebrides are ruled by France and Great Britain. Germany lost the Bismarck Archipelago and part of the Solomons in the World War.

The Fiji Islands, discovered by the Dutch navigator Abel Tasman in 1643, have the most healthy tropical climate in the world. There the thermometer never goes above 90° and never below 63°. White men can live in comfort, as there is no malaria. These islands are perhaps the most beautiful in the Pacific. The king of plants, the glowing hibiscus, burns like flame against the dark green foliage. Every color in the rainbow is found among the other

HAPPY HOMES IN THE SOUTHERN SEAS



A home in the English island of Santa Cruz.



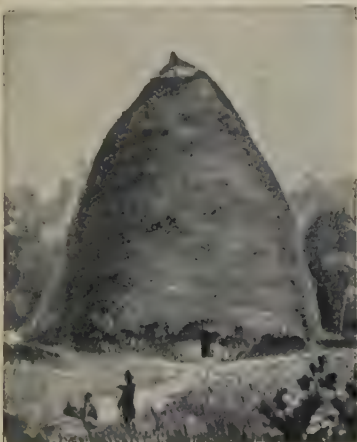
Native houses in Bismarck Island.



A house built on stilts in New Hebrides.



A thatched house in the Fiji Islands.



A house in New Caledonia.



A house to avoid hurricanes in Santa Cruz.

On a journey around the world we see many strange kinds of dwelling-places. These pictures show us how some of the inhabitants of the islands in the great Polynesian group live. This group helps to make up what we call Oceania in the southern seas. Some of these islands belong to France, but many more of them to Great Britain. The houses are not so solidly built as ours, for the climate is very hot.

flowers that grow in profusion wherever there is earth enough to give them root. Feathery palms stretch up to the deep blue sky. Fiji is indeed a gardener's dream come true.

The Loyalty Islands were first marked on the map at the beginning of the nineteenth century by the French explorer D'Urville. For many years the natives were dangerous cannibals, but in recent years they have become thoroughly civilized.

The Louisiade Archipelago numbers about eighty islands and lies southeast of New Guinea. These islands are rich in forests. Gold has also been discovered on some of the islands.

MENDANA'S LOST HOPE— THE ISLANDS OF SOLOMON

The Solomon Islands came by their name in a very fanciful way. In 1568 Alvaro de Mendana, the Spaniard, landed on one of the islands. He was so impressed that he called the group the Islands of Solomon, in the hope that his countrymen would think them the source from which King Solomon got the gold for his temple and might be induced to colonize them. Mendana returned to Spain and himself gathered a party to settle in this wonderful spot, but he was not able to find them again. He went, instead, to the Santa Cruz group, where he soon died. For two hundred years afterward people believed that the islands existed only in Mendana's imagination.

The Santa Cruz group for many years had the reputation of being very dangerous. The natives were savage and warlike, and killed any white man who landed without a strong guard. Bishop Patteson was killed in 1871, and Commodore Goodenough of H. M. S. Pearl met the same fate a few years later.

New Caledonia was one of Captain Cook's discoveries, but it has passed into the hands of the French, who used it for many years as a convict settlement. It was Cook who named the New Hebrides also. At the beginning of the nineteenth century these islands were the gathering place of some of the worst white men imaginable. They forced the natives to work for them at whaling and gathering sandalwood. But even worse than that, they practically kidnaped them and sent them to work on plantations in Queensland. It is no wonder that the natives hated and feared such terrible

beings, and in revenge killed other white men as well as the guilty ones. In New Ireland, one of the Bismarck Archipelago group, the natives are still cannibals.

MISSIONARIES AND TRADERS MAKE OCEANIA KNOWN

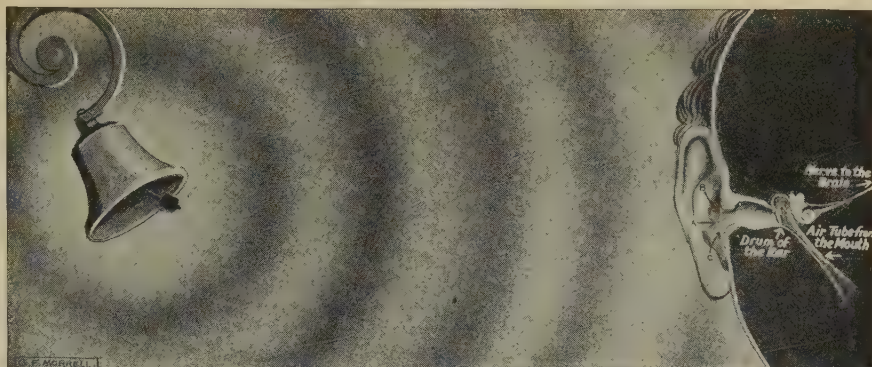
It is the missionaries and traders who have really opened up the Oceanic groups and have made them known to the world. The London Missionary Society first sent workers out to Tahiti, one of the Society Islands, in 1797. For many years brave and devoted missionaries, men and women, of all creeds, have worked among the natives of Oceania. Many of them have been killed, and some have also been eaten by the people they went to serve. Some of the islands are very unhealthy, so many have died of disease. There were countless hardships to be withstood. But gradually they converted some of the savages and taught them not to eat their fellow-men.

Trade with the South Sea Islands has grown steadily ever since the first white men took their lives in their hands and lived on the islands. Many of these men were killed, but others took their places. Sometimes a white trader would be on an island with the nearest white man hundreds of miles away. Some of these men traded for themselves, but many were sent out by European and American companies to do business with the natives. Unfortunately many white men felt the influence of the climate and became as lazy as the natives. But those who wanted to work did a good business in buying copra, trepang, coconuts, pearl shell, ivory nuts, sandalwood, bananas, sugar-cane, rubber, oranges and other tropical products. Nowadays the trading in the islands amounts to a very large sum of money.

SOME OF THE BOOKS ABOUT THE SOUTH SEAS

There are many famous books about the islands of the South Seas. Captain James Cook, who named so many islands, wrote accounts of his voyages. There are two fascinating stories of the Marquesas, Typee and Omoo, by Herman Melville. Robert Louis Stevenson gives splendid descriptions of several of the groups. There are others, but the boy or girl who reads these will have an excellent impression of life in the South Pacific during the last century and a half.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 3429.



This diagram shows how sound-waves travel in ever increasing circles, and how the outer ear collects them, shown by the arrows A, B and C, directing them so that they will strike the drum.

THE MARVEL OF HEARING

WE know something of the brain and the spinal cord, which together are called the central nervous system, in the upper part of which the self of man resides. When we study the history of the central nervous system we find that its first business is to receive communications from the outside world.

These communications take very definite lines, which we call the senses. It is by the senses that we gain all our knowledge of outside things. On the delicacy of the senses, in the first place, the development of the human being to the highest capacity depends.

This quality of sensitiveness is so invaluable that all the higher qualities of mankind are built on it. It is possible to be unduly sensitive—sensitive to a degree that upsets the balance of the mind—but nearly every good thing can be exaggerated.

The senses which communicate with the outer world are: seeing, hearing, taste, smell and touch. We have learned that it is not sufficient merely to say touch, for we must add at least the heat sense, the cold sense and the pain sense to the sense of touch.

In addition to these senses which communicate directly with the outer world there are other senses by which the brain is informed about the body. Of course, in a way, we may say that

CONTINUED FROM 3224



so far as the brain itself is concerned, the body is part of its outer world.

These senses come from the organs inside the body, from the muscles and joints, and from certain wonderful little canals in the inner ear.

Now we can take the senses one by one, and we shall begin with hearing. We know that there is a special part of the brain concerned with hearing. If we were to use the word ear for the part of the body that really hears we should certainly have to say that the real ear is in this part of the brain. The ordinary ear is on both sides of the brain, and the ear for music, as we say, is probably on the left side only in right-handed people, and on the right side only in left-handed people. In great musicians the sensitive ear for music may perhaps be developed equally on both sides of the brain.

But we are quite certain that sound cannot be heard directly by this real ear in our brain. The part of the brain where we feel touch feels nothing if it is itself touched, and this is true of the senses generally. The brain responds only if the communication is made to it through the proper channel. What we now have to study is the channel that leads from the outside to the hearing centre in the brain. The best use of the word ear would be

to describe the whole structure from the surface of the body to the tiny nerve-cells where the hearing is actually done.

**THE MUSCLES OF THE OUTER EAR
HAVE FALLEN OUT OF USE**

The real work of the ear—or, as we should properly say, the *outer ear*—is to catch waves of sound. In most animals the outer ear is provided with small muscles by which it can be moved in various directions. This serves two purposes. First, it enables the animal to make the most of the sound that comes to it. The sound-waves are, to a certain extent, gathered up by the outer ear, and so are made rather more intense. But the second great advantage of being able to move the outer ear is that it greatly helps to decide where a sound comes from.

It is very interesting to find in ourselves three muscles attached to the outer ear by which it might be pulled in various directions. These muscles exactly correspond with those we find in the lower animals, but in ourselves they have fallen out of use. Though they are small, they are still capable of moving the ear; but we do not use them. A few people have the power of moving one or both outer ears at will, but there is no record of any human being who ever moved his outer ears when straining to hear a sound or when trying to judge the direction.

**AN AMUSING GAME THAT TEACHES
US A LESSON IN SCIENCE**

We are able still to judge the direction of a sound, but we cannot judge nearly so well as the lower animals can. The reason, no doubt, is that our outer ears no longer help us. Still, we are able in some degree to compare the intensity of a sound in the two ears, and so we judge more or less where it comes from. If the sound is made at a point equally distant from both ears, we are quite at a loss. A simple and amusing experiment or game will prove this.

Someone is blindfolded and seated in a chair. If we then make little noises, asking him to judge where they come from, he will judge all right as long as they are on one side; but if we make the noises at the back of his neck, in the middle line of his body, or under his chin, he cannot tell the one from the other. He cannot distinguish between a sound made at the back of his neck and a sound made under his chin.

But one of the lower animals could not possibly be deceived in such a case. By pricking its ears forward and back it would in a moment discover in which direction it heard the sound best. When the sound comes from the side, the animal judges, as we do, mainly by comparing the intensity of sound in the two ears.

This seems very simple, and we have no difficulty in doing it; but it is wonderful that the two hearing centres should be able to compare notes, so to speak, and that when the left hearing centre hears loudest we should turn to the right, and when the right hearing centre hears loudest we should turn to the left. This is so because most of the nerve-fibres cross the middle line of the body on their way to the brain.

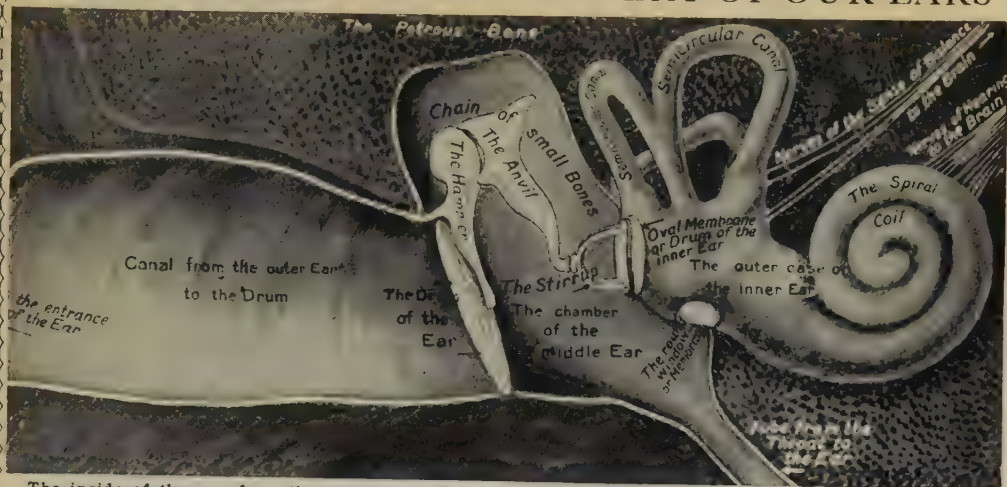
**THE CURIOUS CHANNEL ALONG WHICH
THE SOUND-WAVES PASS**

The outer ear is not entirely useless even in ourselves, for if it is all filled up except just at the opening of the canal that runs inward, we hear less clearly. This experiment can easily be made. It shows us that the outer ear is still useful as a sort of ear-trumpet, though vastly inferior to that of most of the lower animals.

From the outer ear there leads a little channel along which the sound-waves pass. When we cleanse our ears, we cannot wash this channel. It would be a very serious matter if we had to do so, for there would be grave risk of doing harm at its inner end. Yet, as a rule, this channel is kept perfectly clear and open, even though it is never washed. It is lined by tiny glands which produce a sort of wax, and as this wax passes outward it carries impurities away with it. We think of this wax as a rather unpleasant thing; but it is a beautiful means of cleanliness and protection. At its inner end this canal is closed entirely by a piece of thin, delicate membrane like a drum-head; it is called the drum of the ear, or *tympanum*.

This drum is exceedingly important for the purposes of hearing, and it is a delicate thing. If it is injured, the hearing is affected. It may be injured either from within or from without. Sometimes little children push beads or peas into their ears, and they may do much harm in that way. A child might have reason to regret such a foolish action for its whole life. When anything like a bead has got

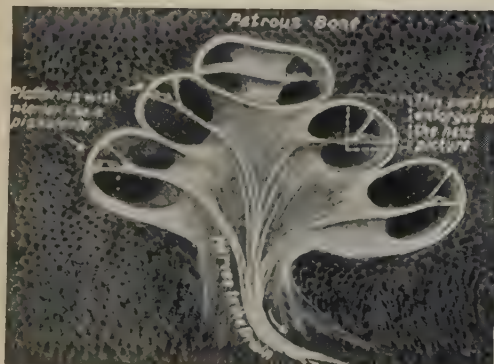
THE WONDERFUL MACHINERY OF OUR EARS



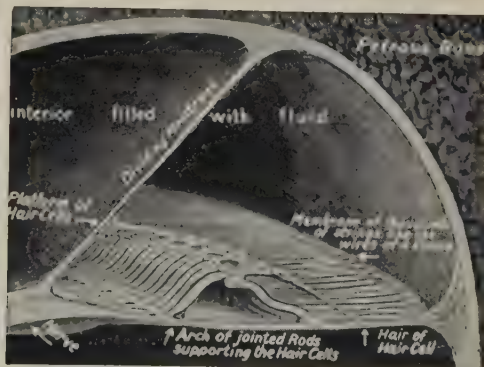
The inside of the ear, from the entrance to the nerve of hearing. On the other side of the drum is the chamber of the middle ear, filled with air from the throat. In this chamber are three bones—the hammer, the anvil and the stirrup. The last is fixed to the drum of the inner ear.



A sound-wave strikes the drum. The vibration moves the hammer, which pulls the anvil and pushes the stirrup against the drum of the inner ear as shown by dotted lines. Tiny waves of fluid pass through a membrane, and round the coils, following the arrows, communicate sensation to the nerve, and then return.



In this picture the spiral coil is cut through from top to bottom. The little galleries are filled with fluid, and contain marvelous organs. The part in the dotted square is shown in the next picture greatly enlarged.



Over 3,000 little hammers, jointed like those of a piano, support thousands of hair-cells resting on a membrane. Over 10,000 strings are stretched across, like piano wires, and these convey the wave sensation to the nerve.

into the ear, we should call the doctor at once and not attempt to get it out ourselves.

This precious drum of the ear is also liable to be injured from within. Ear-ache should not be neglected, because it means, as a rule, more or less of a threat against the health of the eardrum. We shall understand this better when we see what is on the inner side of this drum.

THE LITTLE TUBE THAT RUNS FROM THE THROAT TO THE EAR

If we could see beyond the eardrum we should find that it made one of the walls of a little chamber, hollowed out inside one of the bones of the head. This space is known as the *middle ear*. The bone in which it and the middle ear lie is called the *petrous bone* (from the Greek word for "rock") because it is the hardest bone in the body. This is interesting, because a hard bone must undoubtedly conduct waves of sound very much better than a softer one.

This middle ear is filled with air, and naturally we must ask where the air comes from. The answer is that it comes from the throat. There runs from the back of the throat on each side a little tube which goes to the middle ear and conveys air to it. It is called the *Eustachian tube*. If we shut the mouth and hold the nose, and then make a sharp movement as if we were sneezing, we can feel something happening in our ears. This is because when we made that movement we opened these little tubes and drove some air along them into the middle ears. It is a very important thing for the safety and health of the ear that the air-pressure on both sides of the eardrum should be the same.

If the air-pressure were greater on the outside than on the inside of it, the drum of the ear would be driven inward and strained. If any disturbance in the throat and nose closes up the canals so that the air cannot get along them, this is likely to happen. It is said that when we go quickly down the shaft of a coal-mine it is wise to make a swallowing movement a few times, because in swallowing we open the canals from the throat to the ear. The pressure of the outside air increases as we go down, and the drum of the ear may be strained unless we open these tubes and thus allow the air-pressure on both sides of the drum to remain the same.

WHY A COLD IN THE HEAD MAY CAUSE DEAFNESS

Everyone knows that a cold in the head often causes deafness. The reason is that the cold spreads along the tubes that run to the ear. The lining of the tubes becomes swollen, and so they are closed, and cannot do their duty of keeping the air-pressure of the middle ear the same as the air-pressure outside. The drum of the ear is therefore strained and cannot vibrate as it should do. In more serious troubles of the nose and throat, such as may happen in scarlet fever, the middle ear may be invaded by the disease, and the drum of the ear may be broken through, and deafness for life is the result.

But the most remarkable thing that we find in the middle ear is a chain of three tiny bones, much the smallest bones in the body, which are there for a very special purpose. They are called by Latin names which mean "hammer," "anvil" and "stirrup," and the stirrup especially is like its name. The handle of the hammer lies against the drum of the ear; the hammer is jointed to the anvil, and the anvil to the stirrup; and the foot of the stirrup lies against another sort of drum which leads to the most wonderful place of all—the *inner ear*.

HOW HAMMER, ANVIL AND STIRRUP CARRY SOUNDS

The business of this chain of bones is to carry sound-waves across the middle ear. That is why it has to be filled with air, for otherwise they would not vibrate freely. Every time a sound-wave causes the drum of the ear to vibrate it sets in motion the hammer bone which is fastened to it, and so the vibration goes on. If the joints between the bones become fixed, the hearing is spoiled in some degree. This may happen when people reach old age.

Lastly, we find two muscles which pass into the middle ear. They have opposite uses, and we call them into action—though we know nothing about it—according to whether we want to hear a sound more acutely or less acutely. One of them is so arranged that when it pulls it tightens the drum of the ear, making the drum vibrate more energetically, so that we hear better. Whenever we strain to hear we throw this muscle into action. It is called by doctors the *tensor tympani*, which means "stretcher of the drum."

The other muscle has the opposite

effect. It is attached to the stirrup bone in such a way that when it pulls, the bone cannot vibrate as well as usual. So when this muscle is in action it interferes with the conveyance of sound to the inner ear. When a noise is unpleasantly loud we throw this muscle into action. It is noticed that in certain cases, when there is something wrong with the nerve which supplies this muscle, loud sounds become unusually painful.

That is all we need say about the middle ear. The more closely we study it, the more wonderful we find it, and we

The main part of the inner ear is a very delicate bony structure, rather like a snail's shell. In our picture it is cut right through, and shows us how the canal is arranged in a spiral. We must understand that all this is filled with fluid. When the foot of the stirrup bone is thrown into vibration by a sound, it vibrates the membrane to which it is attached, and so there is started a series of rapid taps to the fluid which is lying against the inner side of that membrane, and the waves run along this spiral coil.

When we carefully examine the inside



THE LISTENERS IN THE WOOD—From the painting by E. A. Hornel.

become almost inclined to think that there can be nothing quite so exquisite and perfect in the whole body until we come to study the inner ear. The whole purpose of the chain of bones in the middle ear is to carry the sound-waves from the drum on its outer wall to a similar sort of membrane on its inner wall. On the inside is the inner ear. The inner ear is filled with fluid, and every sound we hear reaches the nerve of hearing through fluid.

We think of sound as a wave in the air, and that is what it usually is; yet in its last stage, before reaching our nerves, every sound we hear is made of waves in fluid.

of this coil with a microscope we find that we have really come to the essential part of the machinery by which sounds are received. We find that along the whole length of the canal, stretched across it from side to side, is a sort of platform made of delicate fibres. Their number runs into tens of thousands. The canal gets narrower as it reaches the top of the spiral, and so these fibres get shorter.

If the spiral were arranged flat, in a straight line, we should see that the fibres are like a series of piano wires. Upon the whole length of this series of fibres there are perched a number of small but wonderful cells. Each of these has a few

little things like short hairs sticking out from it, and these little fingers, or hairs, lie in the fluid of the spiral canal. Probably it is these hair-like fingers that receive the waves of the fluid, and then something happens in the cells.

THE JOURNEY OF A SOUND FROM THE OUTSIDE TO THE BRAIN

Lastly, if we examine carefully the lower part of each of these cells, we find that the nerve of hearing, which has come to this place from the brain, has sent a few fibres that end at the base of these cells. The fibres do not run into the cells, but the cells are, as it were, perched on the ends of the nerve-fibres.

Now we have actually traced the sound from the outer world to the ends of the nerve of hearing. We have seen its path, sometimes along canals filled with air, sometimes along little bones, then along the canal of fluid, and lastly through their hairs into certain special cells made for the purpose. Here we come to a point which very few understand.

We might suppose that the next thing to happen would be that the sound, having got so far, runs along the nerves of hearing to the brain; but nothing of the sort occurs. Hitherto we have been dealing with things that are wonderful and complicated enough, but at this point we have reached something compared with which all the rest seems simple.

MANY CURRENTS PASS TO THE BRAIN WHEN WE HEAR MUSIC

The sound which reaches the hair-cells of the inner ear does not pass along the nerves of hearing, but it sets up in them a nerve-current which runs to the brain. That nerve-current is not a sound-wave; it is utterly different in every way from a sound-wave. But it is that current, and that alone, which excites the hearing cells in the brain, and in this way enables us to say that we hear.

If we examine the nerve of hearing through a powerful microscope it looks like any other nerve, but to say merely that it is capable of carrying a nerve-current which we translate into sound is not to state half the mystery, for we must consider the infinite variety of sounds that we hear and distinguish every day of our lives.

What must be the number and delicacy and variety of the nerve-currents passing along these nerves of hearing when a great musician conducts a big orchestra, and

can hear every instrument separately and know whether it is in tune or not!

So long as we confine ourselves to the study of the inner ear, and see the tens of thousands of fibres of different lengths, and the hundreds of thousands of hair-cells it contains, we are not so much puzzled, because here is something which seems fitted to correspond with the powers of the sense of hearing.

There ought to be the power of noticing slight differences in sounds by means of an organ so complicated as the inner ear is. But the inner ear would not be of the least use without the nerve of hearing. Every one of these tiny differences in sounds means a tiny difference in the something that runs along the white threads that serve to make up this nerve.

WONDERFUL NERVE-CURRENTS THAT FLASH SENSATIONS TO THE BRAIN

Language cannot say how wonderful these things appear to those who really think about them; and it is a great pity that so many of us should go through the world, hearing, seeing and moving, yet never giving a thought to these marvels on which our lives depend.

The fact that nerve-currents, and not sound-currents, travel along the nerve of hearing is a general truth of all the senses. It is not light that travels along the nerve of vision. The place in the brain where we see is enveloped in utter darkness; no light ever reaches it. What reaches it is the nerve-currents from the nerves of vision. All that light does in entering our eyes is to start those nerve-currents in the ends of the nerve of vision. All that sound does in entering our ears is to start certain nerve-currents in the ends of the nerve of hearing. When we study the immense variety of sensations that are possible, we see that a nerve-current, though we talk about it so easily, must be one of the most complicated and wonderful things in the world. Compared with the waves of sound, light and electricity must be considered rather simple things.

The more we learn about the human body, the more must we agree that we are fearfully and wonderfully made. In all the wonderful story of design and adaptation, working unseen in ways that no intelligence can understand, nothing is more wonderful than this amazing mechanism of the inner ear.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 3425.

The Book of LITERATURE



Ruskin copying the Giotto pictures he loved.



Carlyle among his books.

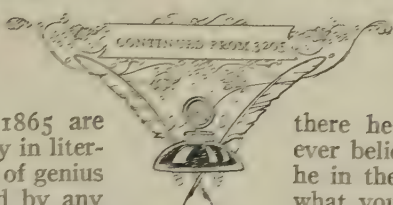
CARLYLE AND RUSKIN

TWO men who showed true genius in the English tongue between the years 1830 and 1865 are very difficult to classify in literature. They were men of genius who cannot be labeled by any special names. In essence they were poets, and in the deepest sense critics. One also was a historian, and both claim a place for themselves in history.

They were men who put genius into their studies of human life in entirely original styles of writing. Though their work is not now hailed as that of almost sacred seers, as when they were alive, they will always be studied with delight and profit. They were bold thinkers on the most vital problems of life, and masters of forms of English that just suited their thought.

These men were the sturdily independent Lowland Scot Thomas Carlyle, and the intensively cultivated and well-to-do Londoner John Ruskin.

Carlyle was the older man by twenty-four years, but their most essential work was done at the same time and ran on parallel lines. Carlyle's most characteristic writing began in 1828, when he was thirty-three, and ended in 1845, when he was fifty. Ruskin's began in 1843, when he was twenty-four, and ended in 1865, when he was forty-six. Each wrote much in later years, but neither added anything then to his fame.



Thomas Carlyle was born in 1795 at Ecclefechan in Dumfries-shire, and

there he is buried. No man ever believed more firmly than he in the divine right of being what you are, if it is the best you can be. He was the educated son of a Scottish stonemason, and he had a character of granite. After a thoughtful review of mankind he believed character the greatest possession.

After a grammar-school course he walked, at the age of fourteen, ninety miles to Edinburgh University, where he was a successful student, both literary and mathematical. Giving up his early idea of being a minister, he became first a schoolmaster and then a private tutor. At the age of twenty-nine he determined to earn his living as a writer and made German his specialty. After his marriage with a lady as clever as himself he became a contributor to *The Edinburgh Review* in its time of great success. He had not then developed his individual style. His essays in *The Edinburgh Review*, *Fraser's Magazine* and other publications, were often literary studies. Some of his subjects were Richter, Burns, Scott, Johnson, Goethe, Heine, Ebenezer Elliott, and this early work, all of great interest, laid down the lines on which afterward he won the fame of a great writer. They included, for example, studies of the periods of the French

Revolution and the English Long Parliament. Indeed, as a reviewer he became known in literary circles as a writer, strong and inspiring in thought and style.

THE FAMOUS BOOK OF CARLYLE WHICH NOBODY WOULD PUBLISH

After his marriage he went to live on a small Dumfries-shire estate, in a secluded house belonging to his wife. There he varied his writing of reviews with the composition of the book that is more representative of him than any other. It contains a kind of veiled account of his early life and an explanation of his philosophy of true living. This was his famous *Sartor Resartus*, or *Philosophy of Clothes*, a plea for simple reality in life and the doing away with all shams.

No publisher would print the book, but finally it appeared in monthly instalments in *Fraser's Magazine*. At this time he removed to London, where he lived in Cheyne Row, Chelsea, till his death in 1881.

Sartor Resartus established Carlyle's position as a great writer in literary circles, but not with the general public, who found it different from anything they had ever read. It was not till the publication of his *French Revolution*, in 1837, that the reading public was captured by the picturesque intensity of his style, as, in a series of scenes, he sketched the incidents and passions and characters of that vast upheaval.

THE TRAGEDY OF THE MANUSCRIPT THAT WAS USED TO LIGHT A FIRE

One of the most tragical occurrences in literary history happened in connection with the writing of the first volume of this great book. At that period Carlyle, though writing fine literature diligently, was comparatively poor. John Stuart Mill, who had himself thought of writing a history of the French Revolution, suggested that Carlyle should take over the task. To help him, he handed over to him the historical books which he had collected dealing with the period. So when the first volume was finished, after long study and agonized writing—for Carlyle never wrote easily—he sent the manuscript to Mill for him to read what he had made of his heavy task. Mill left the manuscript in his library, and an ignorant and careless servant girl used nearly all of it to light the household fires, so that it had to be all written over again!

Mill, greatly distressed by such a

disaster, insisted that Carlyle should accept from him \$500, but it was but a slight compensation for the long labor wasted by stupid and reckless ignorance. Carlyle braced himself up again for the heavy task and rewrote the volume. Happily it became a great success, which gave him an assured position of financial prosperity.

Carlyle now delivered lectures in London on historical and literary subjects, and one series of his lectures was published in 1841, as *Heroes and Hero Worship*. This ranks with *Sartor Resartus* as a book of great significance in Carlyle's developing opinions. He wrote other books, largely in protest against the social condition of the people in the thirties of the nineteenth century. In 1845 came a fourth great volume—his letters and *Speeches of Oliver Cromwell*.

THE BOOK WHICH SHOWED CROMWELL IN A NEW AND TRUE LIGHT

In this great book Carlyle undertook to dispel the injustice and blame that had beclouded Cromwell's name, and to show the true greatness of the man. He succeeded so completely that the historical view of the Protector's character and work was changed, and Cromwell became a national hero. No one is fitted to denounce Oliver Cromwell who has not read the evidence brought forward by Carlyle to expose the misrepresentations of Cromwell's bitter enemies.

Carlyle afterward wrote a charming history of his friend John Sterling. It proves how simply he could write about a simple subject. During the later years of his life he wrote, in many volumes, a history of Frederick the Great of Prussia, a man who did not deserve any such industrious attention.

By the year 1865 Carlyle had risen to the position of a national hero of the type he had often exalted in his writings, and he was received with unbounded enthusiasm as Lord Rector of his own University, Edinburgh. This heart-warming evidence of success was, however, swiftly followed by a deadly blow—the sudden death of his brilliant wife. Afterward he wrote in penitence of his own shortcomings, and his reminiscences were published without discretion after his death. Carlyle felt that he had been so absorbed in his work that he had not given his wife all the consideration she should have had. A great deal too much has been made of

THOMAS CARLYLE RECEIVES BAD NEWS



John Stuart Mill brings to his friend Carlyle the terrible news that a servant girl has burned his manuscript.

the self-accusations of a rather unobservant man, sorrowing for his lack of demonstrative affection, when he felt that the light of his life had gone out.

The books by which Carlyle should be remembered and judged are his *Essays*, *Sartor Resartus*, *French Revolution*, *Heroes and Hero Worship*, *Cromwell's Letters*, *Past and Present*, and *John Sterling*. What kind of man do they show him to have been?

THE FINE AND INDEPENDENT CHARACTER OF THOMAS CARLYLE

He was a profound and fearless thinker, pledged to himself to be sincere; a man of deep and tender humanity, feeling the difficulties and sorrows of men; a man of keen, ironical humor, but capable of honest and healthy laughter, passing into a loving-kindness when his heart was touched. He was fierce in his wrath and scorn if need be, but not untouched by sentiment; a believer in the sacredness of duty and the power of honest work. He believed in a man's standing four-square to all the world, independent in his manhood, an upright spirit, humble but unafraid. Every kind of pretense he hated and scorned and loved to expose.

In short, Carlyle was sound to the core in his insistence on manly honesty in thought and faith and work, and his attitude and teaching are invigorating. He believed that strong, bold manhood will in the end lead the world; but he allowed this belief to lead him into admiration of very strange heroes, and sometimes into contempt for those who are led and are not heroes. He could not conceal his liking for strength, even though it might be sharpened by harshness to the point of cruelty. He could lose himself so as to describe Napoleon as "our last great man," and could even tolerate such a mean soul as Frederick, the so-called Great.

CARLYLE'S PASSIONATE MESSAGE TO HIS FELLOW-MEN

But, in spite of all such mistakes as these, it is a fine sight to see a big poetic soul, a prophet with insight and earnestness, pouring forth his inmost thoughts with passionate frankness. This Carlyle did before all men. Few are bold enough to do it if they could. He did it with vivid power, and so stands a monumental man in a great age, unique in language and character.

John Ruskin had a boyish training as

different from that of Thomas Carlyle as can well be imagined. His father was rich enough to gratify every wish for his boy's welfare. The boy was brought up privately without contact with other children. When he went to Oxford, at seventeen, his mother went with him, and lived in the city during his studentship, that she might see him every day.

His real education came from reading and travel. Ruskin Senior, who was a prosperous wholesale wine merchant, traveled all over England by the highways, and over a good deal of Europe, mingling business with sightseeing, and he took the boy with him. His ambition was that John should become a great poet, and Mrs. Ruskin's hope was that he would grow up to be a bishop. The desire to make him a poet led his father to take him wherever he could see beautiful things, in scenery and in all the forms of art. Everyone felt that the boy was unusually clever. He tried diligently to write poetry, and he was good enough to have become a bishop; but what he did not have, at any time, was a close knowledge of just ordinary people. In fact he was a clever and nice lad coddled and overtrained by parents who were at once too fond and too strict.

LIFELONG ADVENTURES IN THE PATHS THAT LEAD TO GOODNESS AND BEAUTY

With such a beginning it was almost a certainty that he would find gradually his own interests in life, and change them as he knew more of the world, its beauties and its problems. That is exactly what he did. He was a lifelong adventurer, on his own account, along ways that he felt were leading him to beauty and goodness. As he went farther he became a changing, always pursuing beauty and goodness, but constantly altering the direction of his search.

The boy began with drawing as his favorite amusement, and soon added geology to it. Both interests led him to nature, and even when he was a child he was a lover of beautiful scenery. The first time his portrait was painted the artist asked the child what color he would like for a background, and his reply was "blue mountains." When, as a lad of fourteen, he first saw the white jagged barrier of the Alps he was entranced.

His father encouraged this love of nature and of the transference of natural beauty to the painted canvas by giving his

LITTLE JOHN RUSKIN GOES TO CHAPEL



John Ruskin at Chapel with his father and mother in Walworth.

son drawings of beautiful scenes, particularly by Turner. Study of these drawings led the boy to think out the principles of painting, and soon he had found what he regarded as his vocation. That was the exposition and criticism of painting.

This he attempted in the first volume of *Modern Painters*, which was largely in praise of Turner's landscapes. The book was an enormous success, and the praise showered on it led Ruskin's father to be content that he should be a great art critic, leading the world of art.

THE IDEAS OF JOHN RUSKIN WHICH STIRRED THE THOUGHTS OF MEN

But, as the years went on and Ruskin saw more of the works of the great painters of the past, he kept modifying the views he had held. Also he turned with equal eagerness to architecture, and seven years before he completed the five volumes of his *Modern Painters* he had written two books on architecture, with several others on drawing. Meantime his father was urging him to complete his masterpiece in literature, *The Modern Painters*. Instead of that he began casting about for some study that would bring him into closer touch with the common needs of mankind. He wrote books on economics and religion which drew down on him severe criticism from people who thought the only sound views that could possibly be held on political economy and religion and our social relationships were already fixed.

Ruskin's work, though it was that of a changeful thinker, was bold and stimulating and his eloquence had a charm which captured many admirers.

RUSKIN THE ART CRITIC AND RUSKIN THE THINKER

He became a popular lecturer on any subject he was thinking out. It was the earnestness and charm of the man, his sincerity and the purity of his ideals that made him popular. He drew to his lectures equally the practical workman and the theoretical student. When he was appointed Slade professor of the Fine Arts at Oxford, he induced his students to turn out, with pick and shovel, making a new road, as work most worthy for men to do.

Unfortunately, after he reached middle life Ruskin's health began to fail. He had never been strong, and as the breakdown of health came again he grew irritable and impatient, and he grew more and more in-

clined to take up fresh thought and renounce old opinions. Finally he went into retirement in the Lake District and gradually faded out from active life, though his writings, and the public appreciation of his character and intellect, kept him high in honor before the world until his death, in 1900.

Ruskin's writings present him in two characters. One is that of art critic. Unquestionably he made people think about art more vigorously, in agreement or disagreement with him, than they had ever thought before. His writings on art will always be classical, for even if they are wrong here and there, they compel thought.

Then there are his thoughts about life published under such titles as *Unto This Last*, *The Crown of Wild Olives* and *Sesame and Lilies*. Undoubtedly the writings that worried his worthy father and brought so much criticism that the magazines in which he started to give his views would not allow him to go on, contain the opinions that have the greatest hold on men to-day.

TWO MEN WHOSE WORKS HAVE GREATLY ENRICHED THE WORLD

Ruskin is valued because, like Carlyle, he thought for himself. His were the sincere thoughts of the moment from a clear, bold mind. As a writer he was quite unlike Carlyle. Both were painstaking, but Carlyle was painstakingly rugged, surprising, even jerky, while Ruskin was elaborately smooth and flowing. Ruskin charms the more readily by his velvety touch, but he does not wear so long. Carlyle repels us sometimes by his almost uncouth expression, but he can draw us back by a word of softness, so fine is his humanity at heart. Both men stood alone. We must accept them as they were, and be grateful, for there have been no such men since; and there were no figures at all like them in their time.

Carlyle and Ruskin were themselves men of sterling character, who in all they wrote had a lofty ideal of what true manhood should be. They sought to build it up on the foundations of absolute sincerity. Theirs was the vision and the mission of the seers and prophets of an earlier day. Whether we accept or reject their views, they will long remain stimulating influences, alike in the worlds of intellect and of morals.

THE NEXT STORY OF LITERATURE IS ON PAGE 3469.

The Book of Familiar Things

WHAT THIS STORY TELLS US

IN the olden days there was a material to which the botanists gave the name "linum usitatissimum," meaning the most useful of fibres. The cloth made from it was linen which had strength, cleanliness, coolness and beauty. Linen to-day has those same qualities, even though it is now made by machinery instead of by hand as it was in the days of long ago. Many girls and boys have seen old spinning-wheels which their great-grandmothers used to spin the flax into yarn which was woven on a hand-loom into the shining white linen and was used for tablecloths, for bedding and for wearing apparel. In this story it will be explained how the blue-eyed flax plants are taken and put through many processes until a beautiful piece of linen is the result.

HOW WE GET LINEN

LINEN was the first cloth woven from vegetable fabric, and was one of the earliest products of civilization. Skins of wild animals were man's first garments; then the use of wool was discovered. When the land came under cultivation flax was among the plants grown because of the discovery that its fibre could be woven into cloth. This product was held in high regard by the ancients, and it is frequently mentioned in the Bible as an emblem of purity. But the earliest records come from Egypt, and can be dated at least four thousand years ago. In an Egyptian tomb, that of Rameses II, who died in 1258 B.C., which was discovered in 1881, the linen wrappings were in a state of perfect preservation.

The Phœnicians have been given the credit for introducing flax-growing and the making of linen into Ireland, but it was not until many centuries later that definite records of the industry were kept. In 1565 Louis Crommelin, a Huguenot who had fled from France, and who was by trade a weaver of fine linen, settled near Belfast. He improved the methods of weaving. The result of his good work was the forming of the Board of Trustees of the Linen Manufacturers of Ireland in the year 1711. For over a hundred years this body controlled every branch of the linen industry, from the inspecting of the flaxseed to the fixing of the qual-

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ity of the cloth. A high standard was demanded, and Irish linen won a lasting name for quality and reliability. To-day Ireland still holds the foremost place in the linen industry.

The finest quality of dressed flax is produced in Belgium; and much is imported by the Irish weavers. Much linen is also woven in France, Belgium and other countries of Europe. Comparatively little linen is woven in America, and for that, linen yarn is imported from Europe.

On page 2784 the flax plant and its growth are fully described, so we shall commence our story of the making of linen with the ripe plant. Flax, when ripe, has to be pulled by hand because the fibre loses spinning value if cut by a sharp instrument, as the cut leaves square, blunt ends hard to spin into yarn. When the seed is to be saved the flax must be dried after pulling. When dry, the stems are drawn through a ripple, or inverted iron comb with teeth spaced to allow the stems but not the seed bolls to pass through.

In Ireland and Belgium no effort is made to save the seed of the regular crop. So, after pulling, the flax is put up in stacks from eight to ten feet long, formed by bundles standing on end and resting one against the other. It is now ready for retting, a process for separating the fibre from the core of the stem with the least possible break-

age or loss. There is a gum called pectin found in flax-stems which holds the fibres together. The purpose of retting is to remove this gum. In Ireland the bunches of flax straw are stacked in ponds or dams with mud or sod placed on top surmounted by heavy stones to prevent the flax from rising to the surface. For nine days the bundles remain under water while two species of bacteria fight for control. These bacteria are the *pectinovorum* (pectin-eater), which devours the gum, and the *lactici*, which attacks the fibre. As soon as the *pectinovorum* overcomes the *lactici* the retting is complete and the fibre can be separated from the stem.

HOW THE FIBRES ARE SEPARATED FROM THE WASTE MATTER

The next step is to shake the bundles and spread them out on the grass. The spread flax must be turned every day during wet weather and every three days during dry weather to keep its color. The grass exposure should last about fourteen days. Then the flax is stacked for a month before going to the "scutch" mill. Here it first enters a "butting" machine which evens the root ends of the stalks. It goes next through grooved rollers which break up the "boon," or woody matter of the flax-stem, into small pieces. A man, the "scutcher," then holds the stems against revolving wooden blades or beaters which knock off the boon and leave the fibre clean and ready to be sold in bundles to the spinners.

This fibre is called line flax. What was beaten off with the boon is rescutched and spun into yarn, but it would not do for linen-making because of its short fibres. A good flax fibre is from twelve to twenty-four inches in length, and under the microscope its shape is cylindrical. Five tons of flax weighed when taken from the field yield only between 450 and 550 pounds of fibre after retting and scutching are finished.

THE FIRST PROCESSES IN SPINNING THE FIBRE

Many more processes are worked out upon the flax fibre before it is ready for the loom. At the spinning mill the fibres are drawn through coarse steel combs to remove coarse, loose and short bits and to straighten out tangles. This is called "roughing." When a bundle of about forty pounds of this combed fibre is collected it is sent to a "hackling" machine,

which is yet another combing process. This removes any short fibres, leaving nothing but long fibres which will be spun into "line" yarns. The hackled flax in bundles, or "tipples," goes forward to the preparing-room spreader, a frame machine on which loose fibres are drawn out into soft ropes, or "slivers," before they are passed on to the drawing frames, of which there are usually four. From these frames the slivers emerge arranged in degrees of fineness and regularity according to the quality of yarn to be spun.

Before sending the sliver to the spinning machine it passes through "roving" frames. Here it is reduced to the right diameter and becomes a "rove," losing the name "sliver." The rove is then twisted so as to cause the fibres to bind and acquire strength enough to be wound and unwound without parting. Finally the finished rove is wound on a bobbin, or spool, and is ready for the spinner.

HOW THE FIBRES ARE FINALLY SPUN INTO YARN

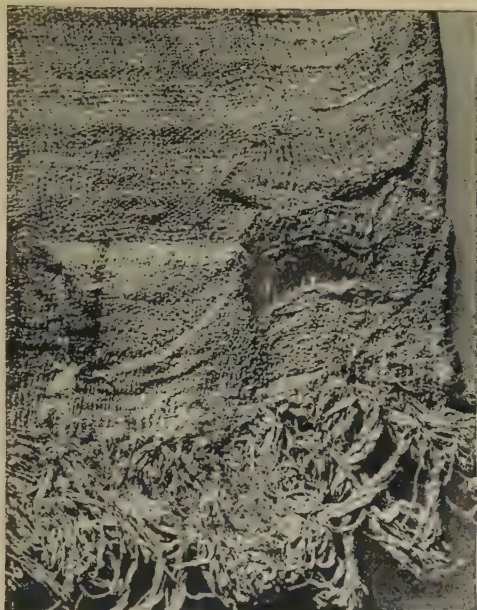
Flax yarns are spun either wet or dry. In wet spinning, rove is first passed through troughs of hot water so that when the fibres pass between rollers they are soft and fall into their proper places easily. Finer linen is made by this method than by dry spinning, which gives much strength but no great fineness. In wet spinning, the bobbins on which the rove is wound are fixed on skewers in the creel of the spinning frame. The rove passes over guides and is submerged in the hot-water trough. Next it passes to the feeding and drawing rollers, where it is wound on bobbins again. These are attached to spindles and turned so as to twist the flax into the necessary yarn. Flax spindles rarely run over 6,000 revolutions, or turns, a minute. Most yarns are given a left-handed twist, and the number of twists is controlled on the machine.

After the yarn is spun the spinning bobbins are sent to the reel-room and wound off into skeins. These are dried and made into bundles for shipping. The shorter fibre, or tow, is spun also and used for coarse materials.

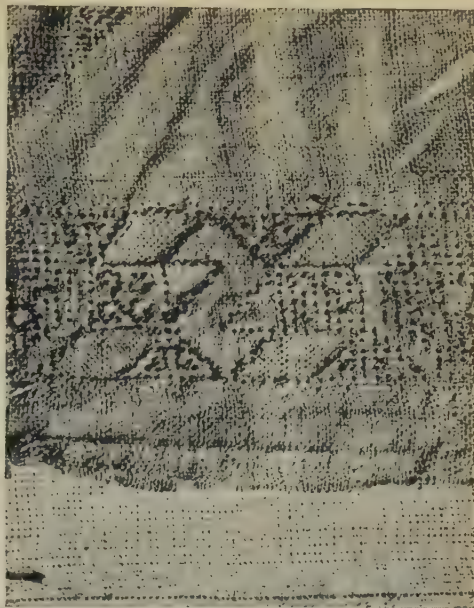
HOW THE YARN IS WOVEN INTO CLOTH

The next operation is weaving, and the first step in this is the rolling of the skeins on to spools and thence on to the warpers' beam of the weaving loom. In weaving,

SAMPLES OF VERY OLD LINEN



EGYPTIAN LINEN, ABOUT 2000 B.C.



COPTIC EMBROIDERY, ABOUT 400 A.D.



ARABIAN EMBROIDERY, ABOUT 900 A.D.

In the tombs of old Egypt many pieces of linen have been preserved, not only mummy-wrappings but large sheets and other articles. The upper picture at the left shows a fragment of linen from the mummy of an Egyptian princess of the Eleventh Dynasty, who lived in Thebes about four thousand years ago. At the upper right is a bit of Coptic embroidery, on linen, done in the fifth century after Christ by a Christian descendant of the old Egyptians. The lower picture gives a piece of embroidery from Arabia of the tenth century.

Photos, courtesy Metropolitan Museum of Art.

GATHERING AND RETTING FLAX



Flax, when ripe, has to be pulled by hand, an expensive and laborious process, but one which it is hoped the invention of suitable machinery will soon overcome. The plant has to be hand-pulled because the fibre loses spinning value if cut by a sharp instrument. The best fibre is obtained when the crop is pulled before it is quite ripe. Care must be taken to keep the long stems and short stems separate.

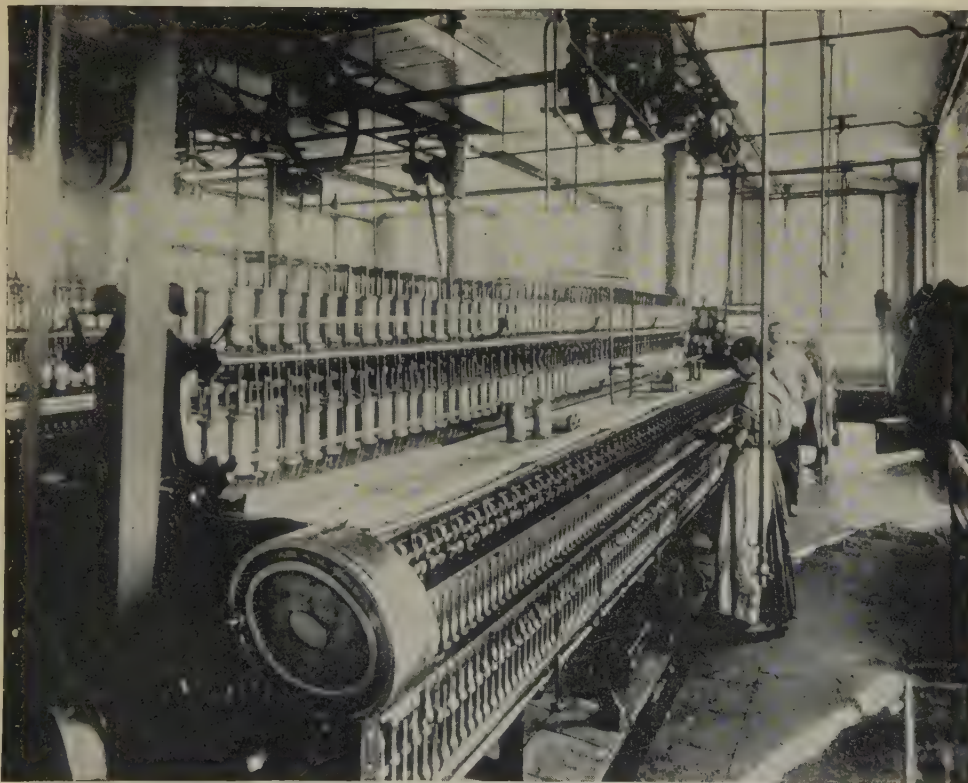


In Ireland the bunches of flax straw are stacked in ponds or dams, with mud or sod placed on top. Heavy stones keep the straw and mud below the surface of the water so that fermentation can take place. This is called "retting," and its object is to separate the fibre from the core of the stem with the least possible breakage and loss.

SCUTCHING AND SPINNING



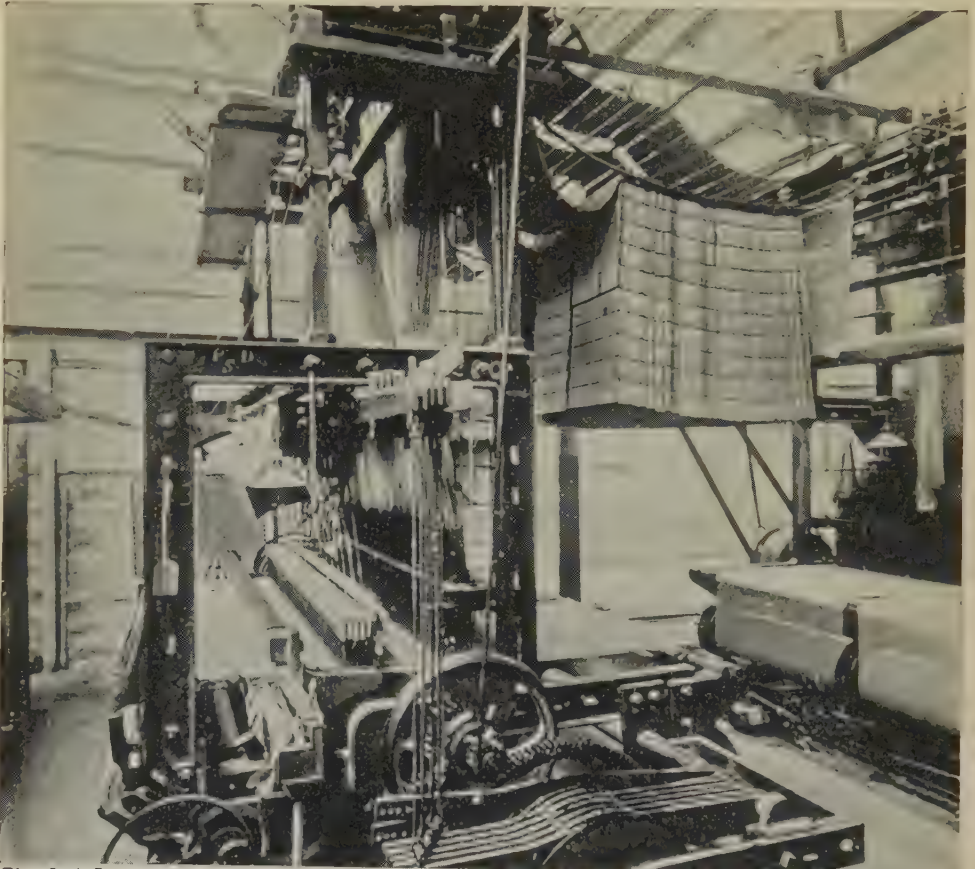
In olden times "scutching" was all done by hand, wooden beaters being used to break up and separate the woody stem. To-day the scutching process is carried out by primitive machinery consisting of revolving wooden blades against which the scutchers hold the flax bundles.



In olden days nearly all women were spinners, and many of them could spin a very fine thread. But in modern times the family spinning wheel has given place to intricate machinery such as we see in this picture. Flax yarns are spun either wet or dry; in Scotland the prevailing custom being dry spinning, whereas in Ireland wet spinning is used almost entirely.

the threads which run up and down the loom represent the "warp," while the cross threads are called the "weft," or "filling." As the yarns run on to the weavers' beam they pass through a starch bath called "dressing." This smooths any loose ends and gives strength during the weaving process. Weaving is done by the shuttle which carries the weft passing under and over the warp threads. By changing the

ready for bleaching, or whitening. Pieces of linen are stitched together, end to end, in one piece many thousands of yards in length. This is called "a pot of cloth." It is put through several washes and boilings with chemicals, and is then spread on the grass for some days. This performance is repeated until a correct stage of whiteness is reached. The web of cloth is then put through a water mangle



The first Jacquard looms were operated by foot and hand, but the demand for quicker work brought changes. Clever men simplified the complicated machinery so that it could be run by steam or electric power, which has become so important in the textile industry.

number of threads passed over or under by the shuttle, different kinds of linen are produced, such as plain cloth, twilled cloth or linen drill, and huckabacks. Most of the table linen used is damask, and it has a woven ornamental design and contrasting weaves.

When the woven fabric is taken from the loom it is run through the cropping machine, which cuts knots and loose threads from the surface of the cloth. The end is now in sight, for the fabric is

and a tank of starched dressing before it is passed over heated rollers, or "calenders," to dry it. The glossy finish is given by a stamping process called "beetling," in which wooden rails rise and fall upon the linen for a period of from thirty to sixty hours. After beetling, the fabric is passed over warm calenders which give it its final touch. It is ready then to be wrapped and sent into the world to carry on the work it is fitted for.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 3415.

LINEN OF DAZZLING WHITENESS



Flax fibre, after retting, is a medium brown in color, and the woven fabric is therefore the same color. It has to be bleached. This process consists of boiling the pieces of linen in a chemical solution, washing them and spreading them out on the grass. This is repeated until the cloth is of a dazzling whiteness.



To produce a tablecloth with a design such as we show in our picture is a long process. The design has to be sketched on ordinary paper, then it must be transferred to paper divided into squares. The final step transfers the design to cardboard strips punched so the threads can be led along the pattern holes.

THE PAST IN PORTRAITS



Photo, courtesy Museum of Fine Arts, Boston.

A portrait of Mr. and Mrs. Ralph Izard, by John Singleton Copley.



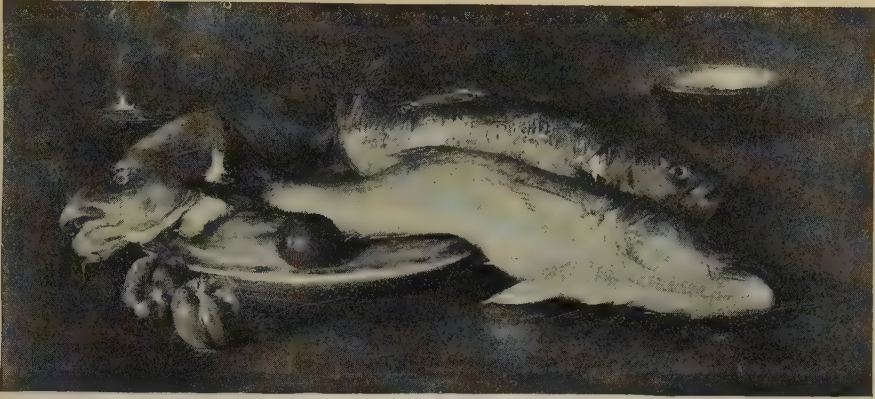
Photo, courtesy New York Public Library.

Portrait of Lady Wentworth, by John Singleton Copley.



Photo, courtesy Pennsylvania Academy of the Fine Arts.

Portrait of Major Thomas Biddle, by Thomas Sully.



From a still-life painting by William M. Chase.

PAINTING IN THE UNITED STATES

PROGRESS IN THE EARLIER YEARS

THE people who first settled the New World were too busy clearing the wilderness, making new homes and protecting them from wild beasts and wild Indians to think about art. They seldom saw a picture. Indeed, the Puritans were inclined to condemn the beautifying of life by art and music as wrongful waste of time. In the Southern colonies, where life was gayer and where homes were more luxurious, one might suppose that art would make its appearance earlier than in the severe atmosphere of the North. In those homes there were paintings that had been brought from Europe. Yet Boston and Philadelphia were the cities first noted for fostering American art, and the part played by the South in the early days was that of patron, not of creator; for at Philadelphia many a Southerner had his portrait painted, and Northern artists traveled in the South to paint portraits there. However, there was little or no American art until the middle of the eighteenth century.

The first paintings made in America were all portraits. There were no photographers in those days, and

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painters tramped through the country painting portraits for a few dollars each. They were known as "limners," from the old word "illuminer." The earliest of them all is said to have been Gustavus Hesselius, from Sweden. Then came Peter Pelham and John Smibert, the latter of whom, a Scotsman, painted chiefly likenesses of the New England preachers, or "divines." His home was in Boston, and he died in 1751.

Of painters who were native-born, before the Revolution, we may count four whose names are noted—Benjamin West, John Singleton Copley, Charles Willson Peale and Gilbert Stuart.

Benjamin West was born, of Quaker parents, near Philadelphia in 1738. He had no early training, but, fascinated by the colors—the vivid reds, blues and yellows—with which the Indians painted their bodies, he taught himself much by experimenting with these. A gentleman interested in the boy's efforts gave him a paint-box, and very soon he was successfully painting portraits. When he was twenty-one one of his patrons sent him

to Rome, and from then on he won great success. Much of his life was passed in London, where he was knighted and became very popular. There he had the honor of succeeding Sir Joshua Reynolds as president of the Royal Academy. He had the kindest feeling for needy art students, and helped many a talented young American. When he died in London, in 1820, he was buried in St. Paul's Cathedral with most impressive ceremony.

Besides portraits, West, who was probably the first Quaker to become a painter, produced his historical scenes. And in this field he showed his independence by painting the figures, not draped in classical robes, as was the custom, but clothed in the garments or uniforms in which the men represented actually lived and died. His first picture of this sort, *The Death of Wolfe*, now in the National Gallery of Canada, created a sensation and almost started a war of artists when it was first exhibited, in London in 1771. That may be counted a starting-point for realistic historical painting.

His work looks somewhat hard and pretentious to us, although some of his portraits have charm and vivacity—such, for instance, as that of Peale, shown here. The success attained by West—an artist who had started with the crudest paints and with brushes made of hairs from the family cat—gave encouragement to others and influenced them to persist in their work.

John Singleton Copley's parents came

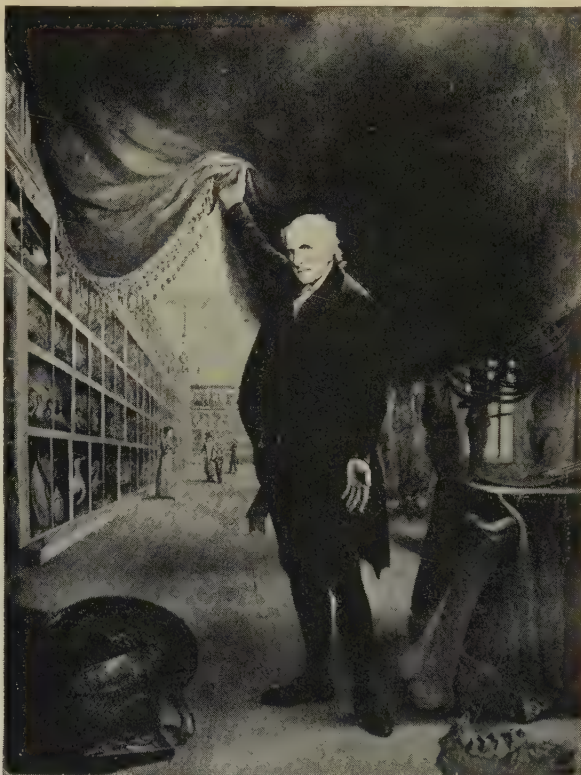
from Ireland. His father, a tobacconist in Boston when the artist was born in 1737, died soon afterward. Later the boy's mother was married to Peter Pelham, a painter and engraver, who gave his stepson valuable training. For a time Copley worked at engraving, but soon turned to portrait-painting. His subjects were the aristocrats of the New World, men and women of character and culture, and he was especially successful

in conveying a sense of dignity and personal distinction, although his painting never lost a hardness and dryness of handling. One of his best-known portraits is that of Lady Wentworth, then a Boston belle of nineteen.

Copley himself, handsome, clever in conversation, of delightful manners, was a great favorite in New England society. When thirty-two he married Miss Clark, the daughter of a wealthy merchant, the very man to whom was consigned the famous

cargo of tea flung into Boston harbor a few years later. Our early artists longed to study the pictures of the Old World. At the height of his success Copley went to Rome, and later to London, where he was welcomed by West and remained until his death, in 1815.

Philadelphia has the distinction of being the earliest American art centre. At the time of the Revolution it was the biggest, the richest and most fashionable city. From early days Philadelphia had been rather more liberal-minded toward the arts than had New England.



Photo, courtesy Pennsylvania Academy of the Fine Arts.
Charles Willson Peale's portrait of himself, called *The Artist and His Museum*.

To Philadelphia came the English painter Robert Edge Pine, who in 1784 held in the State House one of the earliest art exhibitions ever seen in America. And in the same city there lived and painted Matthew Pratt, the first American pupil of Benjamin West.

But the most famous of early painters in Philadelphia was Charles Willson Peale, who was born in Maryland in 1741. Like many another American artist, he began as an artistic craftsman—worker in wood, leather and metal. Then the Swedish painter Hesselius gave him drawing lessons and he decided to pursue art in earnest. He went to Boston to study with Copley, and then to London, where he studied with Benjamin West. Upon his return to this country his first important work was a life-size standing portrait of George Washington in a blue-and-buff uniform.

Peale himself became a soldier in the Revolution and fought in the battles of Trenton and Germantown. He began his second portrait of Washington—a

commission from Congress

—in 1777, during the dreary waiting at Valley Forge. He painted, in all, fourteen portraits of Washington, besides the portraits of many other distinguished men. His work has the force due to earnestness and sincerity of purpose. His son, Rembrandt Peale, also painted portraits of Washington.

The elder Peale deserves to be remembered for still other services to American art. He was one of the founders of the Pennsylvania Academy of Art. In 1779 he built a special art gallery. One of his interests was to gather together a collection of natural-history specimens, mount-

ing and setting them in a way now considered the best. These, with a portrait collection, formed a museum which for twenty-five years, beginning in 1802, was exhibited in the upper part of the State House in Philadelphia. Our portrait of him shows the artist at the entrance to his museum.

Gilbert Stuart was the first American painter that showed true individuality. The son of a Scotch refugee and a Welsh-woman, he was born at Narragansett, Rhode Island, in 1755, and showed his talent for drawing as a child. An understanding doctor who saw

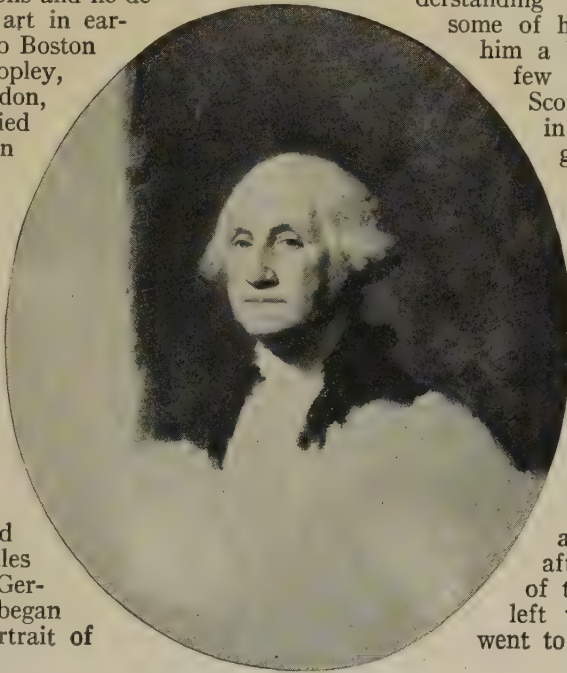
some of his drawings gave him a box of paints; a few years later a

Scotch artist visiting in this country gave him lessons and invited him to go back to Scotland with him. Young Stuart was placed in the University of Glasgow, but his protector died, and the boy, poor and homesick, was glad to make his way home on a collier. Soon after the beginning of the Revolution he left this country and went to London. There, when his money had been used up, he was befriended by

West, who took him first as a pupil, then as assistant.

After eight years in West's studio Stuart set up a studio for himself, where he was soon very busy and very popular, painting the portraits of kings and princes, other artists and various persons of importance. His own gifts and accomplishments made him a favorite socially; but he had the independence to refuse to accept any sitter that did not interest him.

In 1792, drawn by an intense admiration for George Washington, he left his European successes behind and settled in

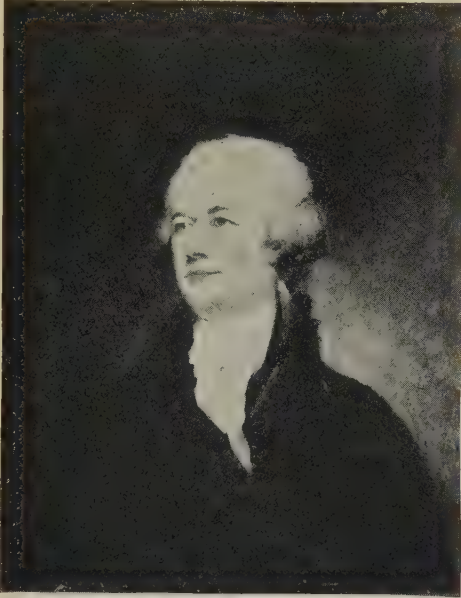


Photo, courtesy Museum of Fine Arts, Boston.
The unfinished Athenæum portrait of George Washington, by Gilbert Stuart.

the United States, where he gratified his desire by painting portraits of Washington.

Three he painted from life; but the first he purposely destroyed, and the last he purposely left unfinished so that he might not have to part with it. This one, the noted Athenæum portrait, was bought from the artist's widow and now has its honored place in the Museum of Fine Arts in Boston. The second portrait, showing the full-length figure, was painted for Lord Lansdowne.

Saying, "I copy the works of God, and leave clothes to the tailor and mantua-



Photo, courtesy Metropolitan Museum of Art.
Portrait of Alexander Hamilton, by John Trumbull.

maker," Gilbert Stuart gave his attention to the face and character of his sitter, rather than to the garments and setting; only when these were expressive of the person did he emphasize them, as in the portrait of Dr. Fothergill, a distinguished Quaker physician, whose drab costume, though so simple, is given careful and delicate handling.

Stuart is "not a painter of great pictures, but of some great portraits. Yet the limitation is in a way an evidence of greatness. It was the fashion of his time to try and paint great pictures. From this he had the hardihood to separate himself, reaching with true originality of feeling after what really interested him, the big essentials in the subjects that he

studied. . . . In the story of American art he holds a unique and dignified position."

After living in New York, Washington and Philadelphia he made his home in Boston until his death, in 1828.

John Trumbull (1756-1843) has been called the connecting link between the early portrait-painters and the American school of landscape-painting. Born in Lebanon, Connecticut, the son of a colonial governor, and graduated at Harvard, he fell under the best educative influence of his day. As a mere boy he joined the Revolutionary army and was soon making himself useful to Washington by his skillful drawing of the enemy's works. But he resigned from the army and went to France, then to London, where he had his turn at studying under West. His experience, however, was unhappy, for the English Government, indignant at the execution of Major André, threw the young painter into prison for eight months and then ordered him out of the country. He returned to England, however, to continue his studies after peace had been established.

The very stirring history then in the making aroused in him a desire to paint historical scenes such as *The Battle of Bunker Hill*. How highly esteemed Trumbull was in his day may be seen by the fact that Congress commissioned him to paint four pictures for the Capitol, for which \$32,000 was appropriated, an amount worth far more then than now.

But he was so much more concerned with portraying facts than with expressing a thought in a truly pictorial and painter-like way that his work did not reach a high level as viewed in the light of our present standards.

A N ARTIST OF HIGH IDEALS WITH A NEW VIEW OF PAINTING

Washington Allston was among the first of his countrymen to see in color and the qualities of painting a separate and independent medium of expression. He was one of the few Southern early American artists, and was born in South Carolina in 1779. But he was educated at Newport, Rhode Island, and then at Harvard.

Allston had the advantage of four years' study in Rome, where he enjoyed the companionship of many distinguished persons, among them Keats, Shelley, Byron and Turner. Life in Rome and

FROM THE BRUSHES OF THREE PAINTERS



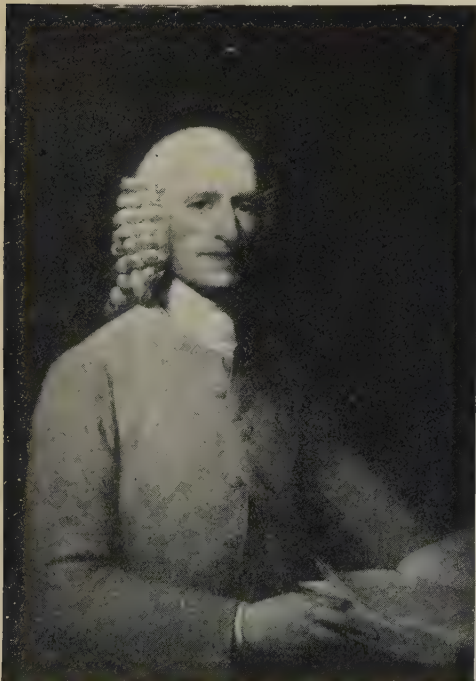
Photo, courtesy Pennsylvania Academy of the Fine Arts.

Portrait of Mrs. James Greenleaf, by Gilbert Stuart.



Photo, courtesy New York Historical Society.

Portrait of Charles Willson Peale, by Benjamin West.



Photo, courtesy Pennsylvania Academy of the Fine Arts.

Portrait of Dr. Fothergill, by Gilbert Stuart.



Photo, courtesy Metropolitan Museum of Art.

Portrait of Mrs. James C. Griswold, by Charles L. Elliott.

the study of Raphael and Michelangelo kindled his imagination and stimulated him to attempt more than his rather limited brush could perform. The *Dead Man Restored to Life* is one of his best-known pictures. Though his achievement was not great, his high ideals and aspirations had a favorable influence on American art.

Edward Malbone, a boyhood friend of Allston, was a miniature-painter whose work is prized almost as much as the work of the best European miniature-painters. He died in 1807, a young man.

PORTRAITURE IN THE FIRST HALF OF THE NINETEENTH CENTURY

A few names stand for the only portrait-painting that was of real value in the second quarter of the nineteenth century. Thomas Sully in his long life painted a great number of pictures. Born in England in 1783, he was nine years old when he was brought to Charleston, South Carolina, to live. As a youth he studied painting with his brother-in-law, a miniature-painter in Charleston, and was afterward a student under Gilbert Stuart for a short time. When he was a young man he set up a studio in New York, but did not meet with success. Feeling the need for more study, he went to London to work under Benjamin West, stayed there as long as his money lasted, then returned to Philadelphia, where he lived until his death, in 1872. Among the portraits that he painted were three of presidents of the United States and one of young Queen Victoria of England. This he made in London soon after she began to reign. Sully's work shows the influence of Gilbert Stuart and of Thomas Lawrence, but he had neither the force of the former nor the elegance of the latter.

Sully's son-in-law, John Neagle (1799-1865), a practically self-taught artist, born in Boston, made his first success in portraiture in Kentucky. Later, in Philadelphia, he became director of the Pennsylvania Academy. His principal works are in the Quaker City, one of the best-known being the picture of Patrick Lyon at the forge. A fine portrait of Dr. William Potts De Wees shows the artist to have been capable of strong characterization and interesting composition. His drawing was very good and his coloring successful; and he left a reputation for industry and enthusiasm in his art.

Chester Harding (1792-1866), though born in Massachusetts, was in his early life a big, sturdy, hard-working pioneer in western New York. After serving as a drummer in the War of 1812 he tried his hand at various occupations, such as making chairs, peddling, keeping a tavern and house-painting. Self-taught, like so many others, he at last became a painter of portraits, and after a little study in Philadelphia had notable success in St. Louis, Washington, Boston and London. He finally settled in Boston. From his brush we have portraits of Madison, Monroe, Daniel Webster, Henry Clay and many others. While his technique was far from perfect, his faculty for perceiving and presenting the human nature in his sitters gives a result of lifelikeness and interest. He may be remembered as "an ardent creature, honest with himself and proud of his profession."

Another painter of portraits of famous men, both in America and in England, is Henry Inman (1803-46), who was born in Utica, New York. His work was faithful and painstaking and sometimes, as in his portrait of Chief Justice Marshall, achieved unusual force.

Charles Loring Elliott (1812-68) had the advantage of being the son of an architect and of studying art in New York. This instruction gave him much practice in drawing—a good foundation for his development. His use of the brush in painting, however, he must have learned for himself, as it was of a sort quite individual at the time—a sort that has become familiar since. With a brush fully charged with paint he got effects that we think of as belonging to a later generation of artists. He stands foremost among portraitists of his own period.

THE FOUNDING OF INSTITUTIONS TO ENCOURAGE ART

It was in 1805 that Peale and others succeeded in organizing the Pennsylvania Academy of the Fine Arts, which has the honor of being the oldest institution of art in the United States. In 1801 a New York Academy of Fine Arts had been started but had had to be given up. Then, during the fall and winter of 1825 to 1826 the National Academy of Design began its career as an important factor in the art life of New York and the whole country. Samuel F. B. Morse, who later gave up painting for invention, was one of the founders. These move-

EARLY FIGURE AND LANDSCAPE PAINTING



Photos, courtesy Metropolitan Museum of Art.
Hagar and Ishmael, by Benjamin West.



A Spanish Girl, by Washington Allston.



Photo, courtesy New York Historical Society.

"Destruction," one of the series of paintings, The Course of Empire, by Thomas Cole.

ments were significant signs of a growing consciousness of the need of art and the value of joining forces to improve opportunities and raise standards of taste.

In the half-century that followed the Revolution, the war for political independence, the United States had been finding its way to distinct national life in various directions. Industrial, or business, independence was worked out before an independent expression of thought and spirit could be reached; but it was not long before national feeling discovered an outlet in an art that went to the beauties of nature at home for subjects to portray. The "Hudson River School" is the name given to the first group of landscape-painters.

THE HUDSON RIVER SCHOOL, FIRST AMERICAN LANDSCAPE GROUP

The forerunner of this school was Thomas Doughty, who was born in Philadelphia in 1793 and died in 1856. His life gives us a good idea of the difficulties encountered by artists in the early days of the country, especially after it seemed to be more than ever cut off by the Revolution from the culture of the Old World. Doughty started as a leather merchant. Thirty years old before he began to paint more than by way of amusement, he was almost forty before he was able to travel abroad and study. He painted many landscapes, some of which have charm. His chief claim to distinction, however, is that he was the first to draw the attention of American painters to the beauties of their own country.

But the one who made the new movement prominent and popular was Thomas Cole (1801-48). Born in England, the son of a wall-paper maker, he came to this country with his family when nineteen. It was at the Academy in Philadelphia that he first had an opportunity to study pictures. From there he went to New York, and then sketched and painted along the Hudson and in the Catskill Mountains. In time his work came to the notice of two older artists, Trumbull and Durand. For a time Cole was very successful. He traveled abroad, and his work was exhibited in the Royal Academy, London. Influenced by the European taste for the grand historical style, he painted several series of pictures in which his romantic imagination took the scenes among which he lived and made

them the setting for poetic allegory. One series is *The Voyage of Life*; another, *The Course of Empire*. In them the charm of his love for natural beauty is confused by the introduction of story motives or moral lessons. Gaudiness in coloring and mistakes in light effects are the chief defects in his painting.

Asher B. Durand (1796-1886), who was born in East Orange, New Jersey, commenced life as an engraver, but after a time began to paint portraits, and in the latter part of his life gave himself to landscape-painting, in which he reached real power of expression. He may be said to have studied painting from the pictures which he copied in engraving. By this work of faithfully copying pictures he gained skill in drawing, too; but his very skill and exactness in detail kept his paintings from showing the unity of composition that a painter gains by selecting and simplifying the parts of a landscape.

J. F. Kensett (1818-72), another engraver who turned to painting, is one of this group of men whose work is a milestone in the progress of American art. His landscapes have a sort of haziness that gives them an air of poetic dreaminess.

Doughty, Durand and Kensett had led the way in the study of nature and its presentation simply and directly in landscape. Following in the same path were two brothers, William and James Hart, born in Scotland, but early transplanted into the Hudson River valley, where, when they had learned to paint, they expressed a pure joy in nature's beauties. William lived from 1823 to 1894, James from 1828 to 1901.

LARGE CANVASES REFLECT THE GRANDEUR OF THE COUNTRY

As the country expanded and people learned more about it, the very size and grandeur of some of its features were reflected in the canvases of the painters. The Rocky Mountains, where lofty peaks and impressive masses stood sharply defined and undimmed under a clear, bright light, were a challenge to the skill of such men as Albert Bierstadt (1830-1902) and Thomas Moran (1837-). Fred-
eric E. Church (1826-1900), another well-known painter of expansive scenes—sometimes real and sometimes imagined—was a pupil of Cole and looked for his subjects up and down the American conti-

nents, from Labrador to the Andes. All of these men painted what we may call "views"; that is, they might show what a scene "looks like, but not what it feels like." "This is the sharp line of difference between the earlier landscapes and those of the present day, in which we shall find the expression of a *mood in nature* to be the painter's aim."

Before the middle of the nineteenth century it became the ambition of young American artists to go to Germany and study in the Academy at Düsseldorf. Bierstadt, who had been born near by, returned there from the New World to become a student under the art teachers in the Academy. And James Hart had part of his training there. Another of the Düsseldorf disciples was Emanuel Leutze (1816-68), who, though born in Germany, had grown up in Philadelphia. He became an able painter, usually choosing historical subjects, although he painted portraits as well. He is best known through his picture of Washington Crossing the Delaware, a large canvas in the Metropolitan Museum of Art. The method of painting is not on a scale with the size of the picture, nor does it measure up to the conception of a great historical subject.

BEGINNINGS OF FRENCH INFLUENCE ON AMERICAN PAINTING

Later the influence of Munich was felt, through the American painters Frank Duveneck and William Chase, who studied there. Of them more farther on. But the strongest and most lasting influence upon American art, as upon that of most of the modern world, has been the influence of France, where the old and the new in method and thought found a broad platform on which to contest for control. You will recall how individualism, in the persons of French realists, impressionists, plein-airists and others, struggled to get away from the restraints of the Academy and its system.

It was at the time when the Barbizon group were making their protest that certain of the young American painters—able and thoughtful men—went to Paris to study. First among them was William Morris Hunt (1824-79), born at Brattleboro, Vermont. During his student years in Europe he went from Düsseldorf to Paris, then on to Barbizon to study under Millet. The more formal instruc-

tions of the first two were rounded out and deepened by the richer experience at Barbizon, where the young painter caught the feeling that a strong underlying motive based on the idea of truth has more value than mere skill in technique or importance of subject. The simplicity, sincerity and breadth of Millet's method, placing nature always before art, was in such contrast with Hunt's earlier training that he could not successfully adjust the two in his own painting. However, upon his return to New England he established a school at Boston, where he passed on to his pupils the great doctrine of sincerity in art, and the belief that art lies in the artist himself rather than in his subject.

Accustomed to the elaborate compositions and detailed method of the earlier men, Hunt's public did not at first see why he should choose simple subjects and treat them in a comparatively simple way. He produced landscapes, figure-studies and portraits; but his greatest work for national art development was accomplished through his teaching.

GEORGE FULLER, WHOSE WORK LOOKED TOWARD THE FUTURE

Living at the same time, another New England painter progressed by his own independent effort to a point much farther along the road of modern expression. He was George Fuller (1822-84), a native of Deerfield, Massachusetts. After starting on the career of painter, he had to drop out of the world of art and become a farmer, when the death of his parents and of an older brother left him responsible for younger members of the family. Before his retirement, however, he had been made an associate of the National Academy and had traveled in Europe, visiting the great galleries and sketching.

Enriched by these experiences, but convinced that he must see nature for himself, Fuller painted alone as he found time, thinking only to give expression to his own thoughts and aspirations. Accident, in the form of a crop failure, brought his pictures to the public, when he found himself forced to send them to Boston to be sold. They were hailed with enthusiasm, and Fuller, after sixteen years of absence, again took his place among professional painters.

Under a veiled and subtle coloring his vaguely outlined figures glimmer with an

effect of light and air that gives them poetic charm. In his attempt to produce this impression of atmosphere he was moving in advance of his generation. Form and technique he never thoroughly mastered, but his genius called out, in color, effects that gave mystical beauty to what might seem the most commonplace subjects—a girl with turkeys or a boy driving home a calf. The secret is that he was always trying to give a feeling of things that lie below the surface. Some of his best pictures are: Winifred Dysart, Nydia, and The Turkey Pasture.

Although Fuller, as Charles Caffin says, "stood on the threshold of the New Movement, peering, like one of his own figures, through the veil," we must turn back to the first days of the Barbizon influence and trace the progress of those ideas which Hunt had introduced but could not fully exemplify in his own work. After a period of assimilation these ideas were to become an essential part of the national art thought, as natural as breath itself. Meanwhile we shall study the work of various men who lived through the time of greatest growth and expansion in idea and in method.

Thus far in a general way we have reviewed the two early periods of painting in America. The first, before 1825, was given to portraiture which aimed for the most part at following the traditions of English portrait-painting; while in the second, between 1825 and 1878, landscape work was done that introduced into art something truly American.

In looking at the landscapes of that time we must keep in mind that the young nation did not for a long time have many or large cities. The open country was the familiar environment of most of the people, wherever they lived—the only environment that many of them ever had. The landscape-painters knew and loved the countryside. And we must remember, too, that until about 1850 the painters did not have the help of practiced instructors or the example of older works of art to guide them, but had to learn for themselves, or from others who were self-taught.

THE CENTENNIAL EXPOSITION, A TURNING-POINT IN AMERICAN ART

The Centennial Exposition at Philadelphia in 1876 was the birthday celebration of the United States at the end of its first century. To the men and women,

the boys and girls of the time, it was an exciting and important event.

Many of the people who went to the Exposition had never before had a chance to look at paintings and sculptures. And there they saw, besides, other things which opened their minds to a knowledge of the Old World's skill and artistry. Even those who could not go to Philadelphia were able to catch distant glimpses of the exhibits—not in moving pictures or fine photographic reproductions, like those of our day, but in drawings for magazine articles or in what you would think rather crude photographs.

In those days world's fairs and art exhibitions were not the familiar events that they are now. Remember that life then was not a thing of electric lights and motor cars, of telephones and talking machines, with crowding impressions such as rush through our minds every day. As for radio and airplanes and moving pictures, they were like things in a fairy tale. It was a time when travel was just beginning to be easy enough and money plentiful enough so that the people of the United States need not feel themselves quite set apart from the rest of the world.

MUSEUMS OPENED, BRINGING ART TO THE PEOPLE

And already a start had been made in bringing together art treasures for the public to study and enjoy. Philadelphia, we have seen, played the rôle of pioneer, early in the century, with its Academy of Fine Arts. In 1870 Boston's Museum of Fine Arts was incorporated, and the same year gave a charter to the Metropolitan Museum of Art in New York. But the Centennial, more than anything else, helped the progress of art development by opening the minds of the people to new appreciation and by giving encouragement to the young artists who were coming home fresh from their years among the studios and richly stored galleries of Europe.

In 1877 a group of eager-minded young men founded the Society of American Artists. The names of these artists and those who joined them in the years that followed are names of significance in our story. In 1906 this society and the National Academy of Design were united, all members of the Society becoming members of the Academy.

The first president of the Society was John La Farge (1835-1910), who

STEPS IN THE PROGRESS OF LANDSCAPE



Photo, courtesy Metropolitan Museum of Art.

A landscape painted in 1853, by Asher B. Durand.



Photo, courtesy New York Public Library.

Cotopaxi, the painting by Frederic E. Church.

through taste and training had gained a broad culture. For very love of art, he studied it because of its part "in the large field of human thought and life" before he chose it as his own life-work. Born in New York, he grew up in a home where books and pictures were loved and appreciated, and where interesting and gifted men and women came together. After thorough foundation-study in school the young man went to Europe and visited Munich, Dresden and London, besides staying for some time in Paris. The work of the Barbizon painters impressed him as most important.

LA FARGE'S INTERESTING STUDIES IN THE FIELD OF COLOR

Still he did not intend to become an artist by profession; and upon his return to New York he studied in a lawyer's office. "No one," he has said, "struggled more against his destiny than I." When at last he did decide to devote himself to art he went to Newport and studied with Hunt. The department of painting in which he was a pioneer and leader in the United States is wall decoration. His work excels in decorative quality of line and color. Instead of copying the apparent colors of nature, La Farge, with the instinct of a scientist, analyzed them to find out the how and why of different effects. And so he worked upon the problem of all modern art—local color seen through the medium of lighted atmosphere. And he arrived independently at the same conclusion as Manet and the impressionists in France—that color and form must be presented as they are affected by varying gradations of light and air.

The influence of neighboring colors upon one another engaged much of his attention, too. In his later years he applied his discoveries in this field to the production of beautiful windows in colored glass, where he used differences in surface and thickness to enhance his rich and subtle color effects. In this art he has been followed in later years by Louis C. Tiffany, of New York.

In his mural painting La Farge aimed at a compromise between the natural and the conventional. He made the fine altar-piece for the Church of the Ascension, New York, and decorated the walls of a number of other public and private buildings. Christ and Nicodemus is one of his best-known pictures. Besides figure-

studies he painted landscapes and flower-studies and interesting scenes in Japan and Samoa.

Two men who studied in Munich and who later became teachers of many other American painters stand out clearly and prominently in the period of change that came about the time of the Centennial. These are Frank Duveneck and William M. Chase. Both were extraordinarily able painters, with a "passion for good workmanship" and great cleverness and ease in the handling of brushes and paints, the technique of their art. In their hands, in fact, there seemed a sort of magic that could brilliantly control the materials with which they worked. Yet both of them are greater as teachers, because of the enthusiasm and inspiration they called out in their students, than they are as artists.

TWO CLEVER PAINTERS WHO WERE INSPIRING TEACHERS

Frank Duveneck (1848-1919) began in Munich to gather around him a group of eager pupils, and afterward was a leader in the art life of Cincinnati and an instructor in its art school for a number of years. He was always true to the older methods of portrait-painting, getting his chief inspiration from the Dutch school, using what has been termed "brown sauce" to get the effects of the old masters, and never yielding to the call of impressionism. But he led the way, among Americans, in proving the value of sound modeling of the figure and in *painting* the picture in upon the canvas—blocking it out directly in masses of color instead of first drawing the design and then coloring it. His portraits have living qualities and indicate real character, but are more interesting as examples of Duveneck's mastery of the brush than from any other point of view.

William M. Chase (1849-1916), who went to Munich in 1872, studied also in Paris with Carolus-Duran, and came back to America in 1878. He used a lighter, gayer, more nearly luminous color-note than Duveneck. With a joyous facility and remarkable cleverness he painted portraits, landscapes, figure-studies and still life—pictures that are full of delight in the painter's craft. All his life Chase continued to hold a central place in the art life of New York, a leader in the movement for technical improvement.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 3447.

The Book of POETRY



GRAY'S ELEGY

THOMAS GRAY, the author of this beautiful elegy, was a great scholar, but he did not write very many poems. The churchyard about which he wrote is that of Stoke Poges, in Buckinghamshire, of which a picture is given above as it was in the time of the poet. Gray died in 1771, and was buried in this churchyard. The Elegy Written in a Country Churchyard is one of the most perfect poems in the English language. The meaning of elegy is explained on page 223.

THE curfew tolls the knell of parting day,
The lowing herds wind slowly o'er the lea,
The ploughman homeward plods his weary way,
And leaves the world to darkness and to me.

Now fades the glimmering landscape on the sight,
And all the air a solemn stillness holds,
Save where the beetle wheels his droning flight,
And drowsy tinklings lull the distant folds:

Save that from yonder ivy-mantled tower
The moping owl does to the moon complain
Of such as, wandering near her secret bower,
Molest her ancient solitary reign.

Beneath those rugged elms, that yew-tree's shade,
Where heaves the turf in many a mouldering heap,
Each in his narrow cell for ever laid,
The rude Forefathers of the hamlet sleep.

The breezy call of incense-breathing morn,
The swallow twittering from the straw-built shed,
The cock's shrill clarion, or the echoing horn,
No more shall rouse them from their lowly bed.

For them no more the blazing hearth shall burn,
Or busy housewife ply her evening care:
No children run to lisp their sire's return,
Or climb his knees the envied kiss to share.

Oft did the harvest to their sickle yield,
Their furrow oft the stubborn glebe has broke;

CONTINUED FROM 3276



How jocund did they drive their team afield!
How bow'd the woods beneath their sturdy stroke!

Let not Ambition mock their useful toil,
Their homely joys, and destiny obscure!

Nor Grandeur hear with a disdainful smile

The short and simple annals of the Poor.

The boast of heraldry, the pomp of power,
And all that beauty, all that wealth e'er gave,

Await alike th' inevitable hour:—

The paths of glory lead but to the grave.

Nor you, ye Proud, impute to these the fault
If Memory o'er their tomb no trophies raise,

Where through the long-drawn aisle and fretted vault

The pealing anthem swells the note of praise.

Can storied urn or animated bust
Back to its mansion call the fleeting breath?

Can Honour's voice provoke the silent dust,
Or Flattery soothe the dull cold ear of Death?

Perhaps in this neglected spot is laid
Some heart once pregnant with celestial fire;

Hands, that the rod of empire might have sway'd,

Or waked to ecstasy the living lyre:

But Knowledge to their eyes her ample page
Rich with the spoils of time did ne'er unroll;

Chill Penury repress'd their noble rage,
And froze the genial current of the soul.

Full many a gem of purest ray serene
The dark unfathom'd caves of ocean bear:
Full many a flower is born to blush unseen,
And waste its sweetness on the desert air.

Some village Hampden, that with dauntless
breast

The little tyrant of his fields withstood,
Some mute inglorious Milton here may rest,
Some Cromwell, guiltless of his country's
blood.

Th' applause of list'ning senates to command,
The threats of pain and ruin to despise,
To scatter plenty o'er a smiling land,
And read their history in a nation's eyes.

Their lot forbade: nor circumscribed alone
Their growing virtues, but their crimes con-
fined;

Forbade to wade through slaughter to a
throne,
And shut the gates of mercy on mankind;

The struggling pangs of conscious truth to
hide,

To quench the blushes of ingenuous shame,
Or heap the shrine of Luxury and Pride
With incense kindled at the Muse's flame.

Far from the madding crowd's ignoble strife
Their sober wishes never learned to stray;
Along the cool sequester'd vale of life
They kept the noiseless tenour of their way.

Yet e'en these bones from insult to protect
Some frail memorial still erected nigh,
With uncouth rhymes and shapeless sculpture
deck'd,
Implores the passing tribute of a sigh.

Their name, their years, spelt by th' unletter'd
Muse,

The place of fame and elegy supply:
And many a holy text around she strews
That teach the rustic moralist to die.

For who, to dumb Forgetfulness a prey,
This pleasing anxious being e'er resigned,
Left the warm precincts of the cheerful day,
Nor cast one longing lingering look behind?

On some fond breast the parting soul relies,
Some pious drops the closing eye requires;
E'en from the tomb the voice of Nature cries,
E'en in our ashes live their wonted fires.

For thee, who, mindful of th' unhonour'd
dead,

Dost in these lines their artless tale relate;
If chance, by lonely Contemplation led,
Some kindred spirit shall inquire thy fate,—

Haply some hoary-headed swain may say,
"Oft have we seen him at the peep of dawn
Brushing with hasty steps the dews away,
To meet the sun upon the upland lawn;

"There, at the foot of yonder nodding beech,
That wreaths its old fantastic roots so high,
His listless length at noon-tide would he
stretch,
And pore upon the brook that babbles by.

"Hard by yon wood, now smiling as in scorn,
Muttering his wayward fancies he would
rove;
Now drooping, woeful-wan, like one forlorn,
Or crazed with care, or cross'd in hopeless
love.

"One morn I miss'd him on the custom'd
hill,
Along the heath, and near his favourite
tree;

Another came; nor yet beside the rill,
Nor up the lawn, nor at the wood was he;

"The next, with dirges due in sad array
Slow through the church-way path we saw
him borne,—

Approach and read (for thou canst read) the
lay
Graved on the stone beneath yon aged
thorn."

The Epitaph

Here rests his head upon the lap of Earth
A Youth, to Fortune and to Fame un-
known;

Fair Science frown'd not on his humble
birth,
And Melancholy mark'd him for her own.

Large was his bounty, and his soul sincere;
Heaven did a recompense as largely send:
He gave to Misery all he had, a tear,
He gain'd from Heaven, 'twas all he
wish'd, a friend.

No farther seek his merits to disclose,
Or draw his frailties from their dread
abode,
(There they alike in trembling hope repose,)
The bosom of his Father and his God.

THE PILGRIM

We are already familiar with John Bunyan as a writer of prose, having read about his *Pilgrim's Progress* on page 5543. He could also write poetry, though not with so much distinction as he could tell a story. This is one of several short pieces of verse which appear in *The Pilgrim's Progress*.

WHO would true valour see,

Let him come hither!

One here will constant be,

Come wind, come weather;

There's no discouragement

Shall make him once relent

His first-avow'd intent

To be a Pilgrim.

Whoso beset him round

With dismal stories

Do but themselves confound;

His strength the more is.

No lion can him fright;

He'll with a giant fight;

But he will have a right

To be a Pilgrim.

Hobgoblin, nor foul fiend,

Can daunt his spirit;

He knows he at the end

Shall Life inherit:

Then, fancies, fly away;

He'll not fear what men say;

He'll labour, night and day,

To be a Pilgrim.

MY MIND TO ME A KINGDOM IS

Sir Edward Dyer, who wrote the following verses on Contentment, was one of the Elizabethan poets. He died in 1607. In this poem the poet likens his mind to a kingdom wherein his wants, cares and ambitions are all wisely controlled. It is said that this was Abraham Lincoln's favorite poem.

MY mind to me a kingdom is,
Such present joys therein I find,
That it excels all other bliss
That earth affords or grows by kind:
Though much I want which most would have,
Yet still my mind forbids to crave.

No princely pomp, no wealthy store,
No force to win the victory,
No wily wit to salve a sore,
No shape to feed a loving eye;
To none of these I yield as thrall:
For why? My mind doth serve for all.

I see how plenty surfeits oft,
And hasty climbers soon do fall;
I see that those which are aloft
Mishap doth threaten most of all;
They get with toil, they keep with fear:
Such cares my mind could never bear.

Content to live, this is my stay;
I seek no more than may suffice;
I press to bear no haughty sway;
Look, what I lack my mind supplies:
Lo, thus I triumph like a king,
Content with that my mind doth bring.

Some have too much, yet still do crave;
I little have and seek no more.
They are but poor, though much they have,
And I am rich with little store:
They poor, I rich; they beg, I give;
They lack, I leave; they pine, I live.

I laugh not at another's loss;
I grudge not another's gain;
No worldly waves my mind can toss;
My state at once doth still remain:
I fear no foe, I fawn no friend;
I loathe not life, nor dread my end.

Some weigh their pleasures by their lust,
Their wisdom by their rage of will;
Their treasure is their only trust;
A cloaked craft their store of skill:
But all the pleasure that I find
Is to maintain a quiet mind.

My wealth is health and perfect ease;
My conscience clear my chief defence,
I neither seek by bribes to please,
Nor by deceit to breed offence:
Thus do I live; thus will I die;
Would all did so as well as I!

SIGH NO MORE, LADIES

From Much Ado About Nothing

In this song, William Shakespeare takes as his theme the inconstancy of men. Women should expect it, he says, and meet it with indifference.

SIGH no more, ladies, sigh no more,
Men were deceivers ever,
One foot in sea and one on shore,
To one thing constant never.
Then sigh not so, but let them go,
And be you blithe and bonny,
Converting all your sounds of woe
Into Hey nonny, nonny.

Sing no more ditties, sing no more
Of dumps so dull and heavy;
The fraud of men was ever so,
Since summer first was leafy.
Then sigh not so, but let them go,
And be you blithe and bonny,
Converting all your sounds of woe
Into Hey nonny, nonny.

O SWEET CONTENT

Thomas Dekker was a dramatist and contemporary of Ben Jonson. Before his death he wrote more than forty plays. This song is from one of them, Patient Grissell, which was acted in 1599.

ART thou poor, yet hast thou golden
slumbers?
O sweet content!
Art thou rich, yet is thy mind perplexèd?
O punishment!
Dost thou laugh to see how fools are vexèd
To add to golden numbers, golden numbers?
O sweet content! O sweet, O sweet content!
Work apace, apace, apace, apace;
Honest labor bears a lovely face;
Then hey nonny nonny, hey nonny, nonny!
Canst drink the waters of the crisped spring?
O sweet content!
Swim'st thou in wealth, yet sink'st in thine
own tears?
O punishment!
Then he that patiently want's burden bears
No burden bears, but is a king, a king!
O sweet content! O sweet, O sweet content.
Work apace, apace, apace, apace;
Honest labor bears a lovely face;
Then hey nonny nonny, hey nonny, nonny!

THE NYMPH'S REPLY TO THE PASSIONATE SHEPHERD

On page 3274 you can find the passionate shepherd's invitation to his love, by Christopher Marlowe. Read it first and then this, wherein Sir Walter Raleigh gives the nymph's reply, full of a prudence that the gallant adventurer himself never practiced.

IF all the world and love were young,
And truth in every shepherd's tongue,
These pleasures might my passion move,
To live with thee, and be thy love.

But time drives flocks from field to fold,
When rivers rage and rocks grow cold;
And Philomel becometh dumb,
The rest complains of cares to come.

The flowers do fade, and wanton fields
To wayward winter reckoning yields:
A honey tongue, a heart of gall,
Is fancy's spring, but sorrow's fall.

Thy gowns, thy shoes, thy beds of roses,
Thy cap, thy kirtle, and thy posies,
Soon break, soon wither, soon forgotten,
In folly ripe, in reason rotten.

Thy belt of straw and ivy-buds,
Thy coral clasps and amber studs,
All these in me no means can move,
To come to thee, and be thy love.

But could youth last, could love still breed,
Had joys no date, had age no need;
Then those delights my mind might move
To live with thee, and be thy love.

GOOD-CHILDREN STREET*

Eugene Field (1850-95) is most widely known as a poet of childhood, and perhaps most admired as a humorist. Most of his work first appeared in his column "Sharps and Flats" in The Chicago Daily News.



THERE'S a dear little home in Good-Children Street—

My heart turneth fondly to-day
Where tinkle of tongues and patter of feet
Make sweetest of music play;
Where the sunshine of love illumines each face,
And warms every heart in that old-fashioned place.

For dear little children go romping about
With dollies and tin tops and drums,
And, my! how they frolic and scamper and shout
Till bedtime too speedily comes!
Oh, days they are golden, and days they are fleet,
With little folk living in Good-Children Street.

See, here comes an army with guns painted red,
And swords, caps, and plumes of all sorts;
The captain rides gaily and proudly ahead
On a stick-horse that prances and snorts!
Oh, legions of soldiers you're certain to meet—
Nice make-believe soldiers—in Good-Children Street.

And yonder Odette wheels her dolly about—
Poor dolly! I'm sure she is ill,
For one of her blue china eyes has dropped out,
And her voice is asthmatic'ly shrill.
Then, too, I observe she is minus her feet,
Which causes much sorrow in Good-Children Street.

'Tis so the dear children go romping about
With dollies and banners and drums,
And I venture to say they are sadly put out
When an end to their jubilee comes.
Oh, days they are golden, and days they are fleet
With little folk living in Good-Children Street.

But when falleth night over river and town.
Those little folk vanish from sight,
And an angel all white from the sky cometh down
And guardeth the babes through the night,
And singeth her lullabies tender and sweet
To the dear little people in Good-Children Street.

Though elsewhere the world be o'erburdened
with care,
Though poverty fall to my lot;
Though toil and vexation be always my share,
What care I—they trouble me not!
This thought maketh life ever joyous and sweet:
There's a dear little home in Good-Children Street.

*From Poems of Eugene Field, copyright, 1910, by Julia S. Field, published by Charles Scribner's Sons. By permission of the publishers.

HEY, DIDDLE DIDDLE!

HEY, DIDDLE DIDDLE!
THE CAT AND THE
FIDDLE,
THE COW JUMPED OVER THE MOON:
THE LITTLE DOG LAUGHED
TO SEE SUCH SPORT,
AND THE DISH RAN AWAY WITH THE
SPOON.



LITTLE VERSES FOR VERY LITTLE PEOPLE

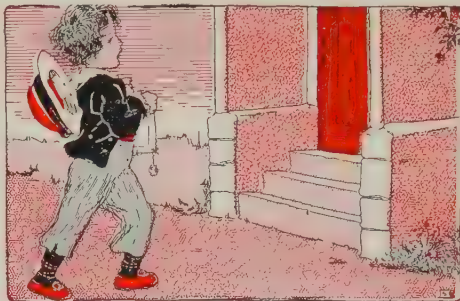
JIM and George were two great lords,
They fought all in a churn;
And when that Jim got George by the nose,
Then George began to grin.

ELIZABETH, Elspeth, Betsy, and
Bess,
They all went together to seek a bird's
nest,
They found a bird's nest with five eggs in,
They all took one, and left four in.



THE King of France, and four thou-
sand men,
They drew their swords and put them
up again.

ADILLER, a dollar,
A ten o'clock scholar,
What makes you come so soon?
You used to come at ten o'clock,
But now you come at noon.



IHAD a little nut-tree, nothing would
it bear
But a silver nutmeg and a golden pear.
The King of Spain's daughter came to
visit me,
And all was because of my little nut-
tree.
I skipped over water, I danced over sea,
And all the birds in the air couldn't
catch me.

GOOSEY, GOOSEY, GANDER

Goos-ey, goos-ey, gan-der, Where shall I wan - der? Up-stairs and down-stairs, And

in my la - dy's cham - ber; There I met an old man Who

would not say his pray'rs; I took him by the left leg, And threw him down-stairs.



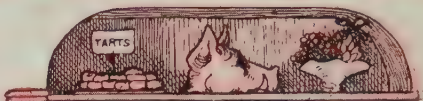
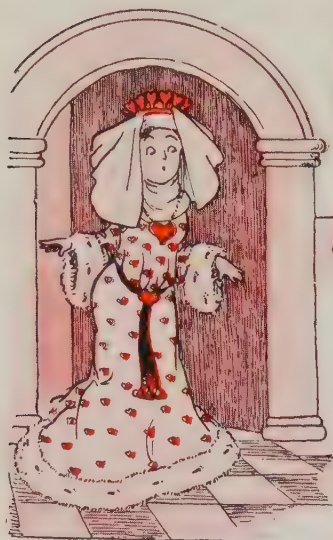
Goosey, Goosey, Gander,
Whither shall I wander?
Upstairs and downstairs
And in my lady's
chamber.

There I met 'an old man
Who wouldn't say his
prayers,
I took him by the left leg
And threw him down
the stairs.





The Knave of Hearts



1

The Queen of Hearts
She made some tarts
All on a summer's day;

2

The Knave of Hearts
He stole those tarts
And took them right
away.



3

The King of Hearts
Called for those tarts
And beat the Knave
full sore;



4

The Knave of Hearts
Gave back the tarts
And vowed he'd steal
no more.



MY FATHER HE DIED AND I CANT TELL YOU HOW



MY father, he died, but I can't tell you how;
He left me six horses to drive in my
plough:

With my wing, wang, waddle, oh,
Jack sing, saddle, oh,
Blowsey boys, bubble, oh,
Under the broom.

I sold my six horses, and I bought me a cow;
I'd fain have made my fortune, but did not
know how:

With my wing, wang, waddle, oh,
Jack sing, saddle, oh,
Blowsey boys, bubble, oh,
Under the broom.

I sold my cow, and I bought me a calf;
I'd fain have made a fortune, but lost the best
half:

With my wing, wang, waddle, oh,
Jack sing, saddle, oh,
Under the broom.

I sold my calf, and I bought me a cat;
A pretty thing she was, in my chimney corner
sat:

With my wing, wang, waddle, oh,
Jack sing, saddle, oh,
Under the broom.

I sold my cat, and bought me a mouse;
He carried fire in his tail, and burnt down my
house:

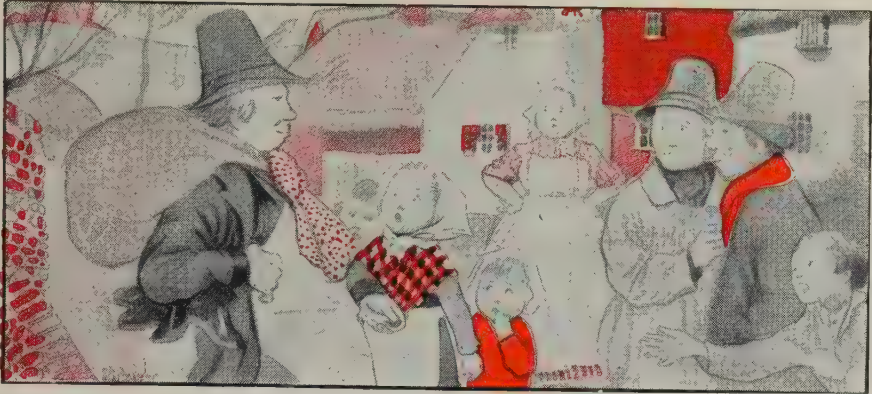
With my wing, wang, waddle, oh,
Jack sing, saddle, oh,
Blowsey boys, bubble, oh,
Under the broom.



THE VOICE OF THE CUCKOO CAME FROM THE FIRE



The brothers, Scrub and Spare, were sitting before the fire, when suddenly from out the flames they heard the spring bird's voice saying "Cuckoo! cuckoo!" "It is something bad," said Scrub, very frightened.



THE COBBLERS AND THE CUCKOO

A TALE FROM GRANNY S WONDERFUL CHAIR

ONCE upon a time there stood in the middle of a cold, bleak moor, in the far North Country, a certain village; all its inhabitants were poor, for their fields were barren, and they had little trade. But the poorest of them all were two brothers called Scrub and Spare, who followed the cobbler's craft, and had but one stall between them. It was a hut built of clay and wattles. There they worked in most brotherly friendship, though with little encouragement.

The people of that village were not extravagant in shoes, and better cobblers than Scrub and Spare might be found. Nevertheless, Scrub and Spare managed to live by means of their trade, a small barley field and a cottage garden, till one unlucky day when a new cobbler arrived in the village. He had lived in the capital city of the kingdom, and, by his own account, cobbled for the queen and the princesses. His awls were sharp, his lasts were new; he set up his stall in a neat cottage with two windows.

The villagers soon found out that one patch of his would outwear two of the brothers'. In short, all the mending left Scrub and Spare and went to the new cobbler. So the brothers were poor that winter, and when Christmas came they had nothing to feast on but

CONTINUED FROM 3246



a barley loaf, a piece of musty bacon and some small beer of their own brewing. However, they made a great fire of logs, which crackled and blazed with red embers, and in high glee the cobblers sat down to their beer and bacon. The door was shut, for there was nothing but cold moonlight and snow outside; but the hut, strewn with fir boughs, and ornamented with holly, looked cheerful as the ruddy blaze flared up and rejoiced their hearts.

"Long life and good fortune to ourselves, brother!" said Spare. "I hope you will drink that toast, and may we never have a worse fire on Christmas—but what is that?"

Spare set down the drinking-horn, and the brothers listened astonished, for out of the blazing stump they heard "Cuckoo! cuckoo!" as plain as ever the spring bird's voice came over the moor on a May morning.

"It is something bad," said Scrub, terribly frightened.

"Maybe not," said Spare.

And out of the deep hole at the side which the fire had not reached flew a large gray cuckoo, and lit on the table before them. Much as the cobblers had been surprised, they were still more so when the bird began to speak.

"Good gentlemen," it said slowly, "can you tell me what season this is?"

"It's Christmas," answered Spare.

"Then a merry Christmas to you!" said the cuckoo. "I went to sleep in

that I will bring you some present for your trouble."

"Stay, and welcome," said Spare. "I'll make you a good warm hole in the thatch. But you must be hungry after that long



SCRUB AND FAIRFEATHER HAD A WEDDING FEAST, AT WHICH ALL THE VILLAGE DANCED

the hollow of that old stump one evening last summer, and never woke till the heat of your fire made me think it was summer again; but now, since you have burned my lodging, let me stay in your hut till the spring comes round—I want only a hole to sleep in—and when I go on my travels next summer be assured

sleep. Here is a slice of barley bread. Come, help us to keep Christmas!"

The cuckoo ate up the slice, drank water from the brown jug—for he would take no beer—and flew into a snug hole which Spare scooped for him in the thatch of the hut. So the snow melted, the heavy rains came, the cold grew

less, the days lengthened, and one sunny morning the brothers were awakened by the cuckoo shouting its call to let them know that at last the spring had come.

"Now," said the bird, "I am going on my travels over the world to tell men of the spring. There is no country where trees bud or flowers bloom that I will not cry in before the year goes round. Give me another slice of barley bread to keep me on my journey, and tell me what present I shall bring you at the end of the twelve months."

"Good Master Cuckoo," said Scrub, "a diamond or a pearl would help such poor men as my brother and I to provide something better than barley bread for your next entertainment."

"I know nothing of diamonds or pearls," said the cuckoo; "they are in the hearts of rocks and in the sands of rivers. My knowledge is only of that which grows on the earth. But there are two trees hard by the well that lies at the world's end. One of them is called the golden tree, for its leaves are all of beaten gold. As for the other, it is always green, like a laurel. Some call it the wise, and some the merry tree. Its leaves never fall, but they that get one of them keep blithe hearts in spite of all misfortunes, and can make themselves as merry in a poor hut as in a handsome palace."

"Good Master Cuckoo, bring me a leaf off that tree!" cried Spare.

"Now, brother, don't be foolish!" said Scrub. "Think of the leaves of beaten gold! Dear Master Cuckoo, bring me one of them."

Before another word could be spoken the cuckoo had flown.

The brothers were poorer than ever that year; nobody would send them a single shoe to mend. The new cobbler said, in scorn, they should come to be his apprentices; and Scrub and Spare would have left the village but for their barley field, their cabbage garden and a maid called Fairfeather, whom both the cobblers had courted for more than seven years.

At the end of the winter Scrub and Spare had grown so poor and ragged that Fairfeather thought them beneath her notice. Old neighbors forgot to invite them to wedding feasts or merry-makings; and they thought the cuckoo

had forgotten them too, when at day-break, on the first of April, they heard a hard beak knocking at their door, and a voice crying: "Cuckoo! cuckoo! Let me in."

Spare ran to open the door, and in came the cuckoo, carrying on one side of his bill a golden leaf, larger than that of any tree in the North Country; and on the other, one like that of the common laurel, only it had a fresher green.

"Here!" it said, giving the gold to Scrub and the green to Spare.

So much gold had never been in the cobbler's hands before, and he could not help exulting over his brother.

"See the wisdom of my choice," he said, holding up the large leaf of gold. "As for yours, as good might be plucked from any hedge. I wonder a sensible bird should carry the like so far."

"Good Master Cobbler," cried the cuckoo, finishing the slice, "your conclusions are more hasty than courteous. If your brother be disappointed this time, I go on the same journey every year, and, for your hospitable entertainment, will think it no trouble to bring each of you whichever leaf you desire."

"Darling Cuckoo," cried Scrub, "bring me a golden one."

And Spare, looking up from the green leaf on which he gazed, said: "Be sure to bring me one from the merry tree."

And away flew the cuckoo once again on his travels over the world.

Scrub vowed that his brother was not fit to live with a respectable man; and taking his lasts, his awls and his golden leaf, he left the wattle hut and went to tell the villagers.

They were astonished at the folly of Spare, and charmed with Scrub's good sense, particularly when he showed them the golden leaf, and told them that the cuckoo would bring him one every spring. The new cobbler immediately took him into partnership; the greatest people sent him their shoes to mend; Fairfeather smiled graciously upon him, and in the course of that summer they were married, with a grand wedding feast, at which the whole village danced, except Spare, who was not invited.

As for Scrub, he established himself with Fairfeather in a cottage close by that of the new cobbler, and quite as fine. There he mended shoes to every-

body's satisfaction, had a scarlet coat for holidays and a fat goose for dinner every wedding anniversary.

Spare lived on in the old hut and worked in the cabbage garden. Every day his coat grew more ragged, and the hut more weatherbeaten; but people remarked that he never looked sad or sour; and the wonder was that, from the time they began to keep his company, the tinker grew kinder to the poor ass with which he traveled the country, the beggar-boy kept out of mischief and the old woman was never cross to her cat or angry with the children.

I know not how many years had passed in this manner when a certain great lord, who owned that village, came to the neighborhood. His castle was ancient and strong, with high towers and a deep moat. All the country, as far as one could see from the highest turret, belonged to this lord; but he had not been there for twenty years, and would not have come then, only he was melancholy.

The cause of his grief and sorrow was that he had been prime minister at court, and in high favor, till somebody told the crown prince that he had spoken disrespectfully concerning the turning out of His Royal Highness's toes, whereon the North Country lord was turned out of office and banished to his own estate. There he lived for some weeks in a very bad temper; but one day in the harvest time his lordship chanced to meet Spare gathering water-cresses at a meadow stream, and fell into talk.

How it was nobody could tell, but from the hour of that discourse the great lord cast away his melancholy, and went about with a noble train, making merry in his hall, where all travelers were entertained and all the poor were welcome.

This strange story soon spread through the North Country, and a great company came to the cobbler's hut—rich men who had lost their money, poor men who had lost their friends, beauties who had grown old, wits who had gone out of fashion—all came to talk with Spare, and, whatever their troubles, all went home merry. The rich gave him presents, the poor gave him thanks.

By this time his fame had reached the court. There were a great many discontented people there besides the King, who had lately fallen into ill-humor be-

cause a neighboring princess, with seven islands for her dowry, would not marry his eldest son. So a royal messenger was sent to Spare, with a command that he should go to court.

"To-morrow is the first of April," said Spare, "and I will go with you two hours after sunrise."

The messenger lodged all night at the hut, and the cuckoo came at sunrise with the merry leaf.

"Court is a fine place," he said, when the cobbler told him he was going; "but I cannot go there—they would lay snares and catch me. So be careful of the leaves I have brought you, and give me a farewell slice of barley bread."

Spare was sorry to part with the cuckoo, but he gave him a thick slice, and, having sewed up the leaves in the lining of his leathern doublet, he set out with the messenger on his way to the royal court.

His coming caused great surprise; but scarce had his Majesty conversed with him half an hour when the princess and her seven islands were forgotten, and orders given that a feast for all comers should be spread in the banquet hall. The princes of the blood, the great lords and ladies, ministers of state and judges of the land after that discoursed with Spare, and the more they talked the lighter grew their hearts, so that such changes had never been seen.

As for Spare, he had a chamber assigned him in the palace, and a seat at the King's table; one sent him rich robes and another costly jewels; but in the midst of all his grandeur he still wore the leathern doublet, which the palace servants thought remarkably mean. One day, the King's attention being drawn to it by the chief page, his Majesty inquired why Spare didn't give it to a beggar. But the cobbler said: "High and mighty monarch, this doublet was with me before silk and velvet came—I find it easier to wear than the court cut; moreover, it serves to keep me humble, by recalling the days when it was my holiday garment."

The King thought this a wise speech, and commanded that no one should find fault with the leathern doublet. So things went, and Spare prospered at court until the day when he lost his doublet, of which we read in that part of this book beginning on page 5532.

A BOX OF GOOD LUCK

A GENTLEMAN in France was walking one day through the streets when he saw a pretty little "twist" in a baker's shop-window.

"That is the very thing to tempt my poor little girl," he said, and went into the shop to buy the pretty bread for his invalid child.

While he was waiting for his change a little mite of a boy, six or seven years of age, very poor, but neatly dressed, entered the shop.

"Madame," he said to the baker's wife, "mamma has sent me here to fetch a loaf."

"Have you any money?" she said, with a smile, placing an immense loaf in the little arms.

"No, madame; but mamma says she will come and speak to you to-morrow."

"All right; run away with your loaf."

"Thank you, madame," said the child.

The gentleman received his change, and was just about to leave the shop when he discovered the little boy still standing behind him.

"Hallo!" said the baker's wife, "are you still there? What is the matter? Doesn't the loaf suit you?"

"Oh, yes!" replied the boy.

"Then carry it to your mother," said the woman. "If you are late, she will scold you for loitering."

The child did not seem to hear. Something held him spellbound. The baker's wife went up to him and tapped his cheek.

"Come, what are you dreaming about?"

"Madame," said the child, "who is it that sings here?"

"No one."

"Yes; listen!"

The baker's wife and the gentleman both listened, but could hear no singing, only the chirping of the crickets, which are found in French bakeries.

"It is a little bird," whispered the boy; "or perhaps the bread sings in the oven, like the apples."

The baker's wife laughed.

"That is nothing but the crickets, my little man."

"Crickets!" cried the boy. "Are they really crickets?" He blushed suddenly scarlet. "Oh, madame," he said eagerly, "I should be so happy if you would only give me a cricket!"

"Why, what do you want with a

cricket? I should be glad if I could give you all I have in the house."

"Oh, madame, only one, if you will!" said the child, putting his hands together above his loaf. "Someone told me crickets bring good luck to houses; perhaps if we had one at home, my poor mamma, who is so sad and ill, would never cry any more."

The gentleman looked at the baker's wife. She was wiping a tear away.

"And why does your mother cry, little man?" he asked gently.

"It is the bills," answered the child. "My daddie is dead, and my mother has to work hard because of these bills."

The gentleman took the little boy in his arms and kissed him. The woman went to the bakery; she was afraid to touch the crickets herself, but she got her husband to catch four and put them in a box with holes in the lid for them to breathe through; then she brought the box to the child, who received it with a kind of joyful awe. He went out like someone in a dream.

When he was gone, "Poor little chap," said the gentleman and the woman together. She went to her desk, opened the book at the page where the widow's account for bread was written, and, drawing a pen through it, wrote at the bottom "Paid."

The gentleman took out all his silver, and, giving it to the baker's wife, said: "Will you place this money in the receipted bill and send it to the poor widow, with a note saying that one day her child will certainly grow up to be a joy to her and a help?"

This was done. A long-legged baker's boy set off at a good trot, and arrived at the sad and humble home long before the little mite with his big loaf and his box of crickets.

When the child did arrive, he found his mother (for the first time since his father's death) joyous and gay. Immediately he thought to himself: "It is the crickets."

And it is really quite certain that but for those crickets and his own good heart this happy change of fortune would never have taken place.

In after-years the boy did grow up to be a help and a joy to his mother, just as the gentleman had written.

RAPUNZEL'S GOLDEN LADDER

A YOUNG Prince was hunting one day in a forest in Germany when he heard a girl singing sweetly and sadly to herself. He followed the sound and came to a tower in which there was no door or stairs. As he stood among the trees, wondering where the entrance was, a Witch hobbled up and sang:

"Rapunzel! Rapunzel!
Let down your hair."

A lovely maiden at once came to the window at the top of the tower, and unbound her golden tresses, and they were so long that they touched the ground, and the Witch slowly climbed up them.

"Ah," said the Prince, "I will use that golden ladder!"

When the Witch departed, he also sang:

"Rapunzel! Rapunzel!
Let down your hair."

Rapunzel did so, and he ascended. But, oh, how startled she was when he appeared! She had never seen a man before. The Witch had taken her from her parents when she was a baby and put her in the tower, and there she had grown up all alone. The Prince talked to her so lovingly that her heart was soon won, and she promised to marry him.

"Now, my dearest," said the Prince, when it grew dark, "I must find a silken ladder by which you may escape. I will bring it to-morrow when the Witch has gone away."

Unhappily, Rapunzel was very simple-minded. When the Witch came and climbed up her hair, she said: "How long you take, granny! The Prince climbs up in an instant."

"What!" said the Witch, raging with anger. "After all the trouble I have

taken to keep you separate from the world, you let down your hair for a man to climb up! You must die!"

Seizing a pair of scissors, she cut off Rapunzel's hair, led her into a desert and left her there to perish. The Witch then returned to the tower, and climbed up by means of the golden tresses, which she had tied round the window-bar.

"Rapunzel! Rapunzel!
Let down your hair,"

sang the Prince, as he came through the forest, carrying a silken ladder. Then, seeing the tresses, he gaily climbed up, and entered the room.

"Ah, ah!" shrieked the Witch, as she saw him looking around for Rapunzel. "The pretty little bird isn't in the nest. The cat has killed it, and the cat is going to scratch your eyes out."

She pushed the Prince, and he tumbled out of the window, and fell on a bush, and the thorns pierced his eyes. After wandering blindly about the forest, he came to the desert, and heard Rapunzel singing sweetly and softly to herself.

He followed the sound, and she saw him, and ran up and fell upon his neck

weeping, and two of her tears fell in his eyes, and he recovered his sight.

The bad old Witch, who had been watching from the top of the tower, saw the lovers meet, and she was so angry at their happiness that her rage choked her and she died.

The Prince at once led Rapunzel to his father's kingdom, and there they were joyfully married in great splendor.

And among their prized treasures was a rug made from Rapunzel's hair, which the Prince recovered from the tower.

THE NEXT STORIES ARE ON PAGE 3441.



"Ah," said the Prince, "I will use that golden ladder."



HOW DID MEN FIND FIRE?

THINK of a place where gas and kerosene are not used, where there is no electric light, where there are no matches, and you get an idea of what things were like when your great-grandfather was a little boy. He may have remembered when old rags were burned to make tinder for the morning; how one would have to get up and strike a piece of iron on a flint and make sparks fly to set light to the tinder, so that something else could be lighted from it. If the tinder were damp or the flint old and there were no live coals in the ashes, then there was nothing to do but to go to a neighbor's house and borrow some fire.

Nobody really knows how we first got fire and light. But it is supposed that men first found that sticks would burn if dropped into some hole where melted lava from a volcano lay boiling. Or they may have seen trees catch fire through being struck by lightning. Men later learned that by rubbing two pieces of wood together they could cause them to catch fire, and for thousands of years that was the way in which they set light to their wood. Savages in many parts of the world still do this; but as wet wood cannot be made to light in this way, they keep fires always burning where the forests are damp, or, at any rate, during the rainy season. Striking fire from flint

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came a very long time after the rubbing of wood, for during thousands of

years men did not know how to get and use iron.

When they got used to making fires with which to cook their food and to keep themselves warm at nights, they found that certain resins or gums from trees would burn with a bright flame and last longer than wood alone. So they would melt the resin and dip twigs into it, and so make torches, which would serve to light their homes at night. This sort of light had to serve for ages. In fact, the iron stands in which torches used to be fixed are still to be seen on old houses in Europe.

There was no gas in any street in the world when the nineteenth century came in. Boys ran about the town at night carrying torches, or links, as they were called, and if you wanted to go to a friend's house after daylight had gone you had to hire a link-boy to light the way.

Napoleon and Nelson never saw a gas-lamp. In their days the best lights were candles and little oil-lamps, such as men had had for hundreds of years before. When we read about the past splendors and marvels of the palaces of the East, or of the luxury and delight of the great baronial halls of England, we must remember that these places were gloomy and murky

at night, with their smoky lamps and dim candles or torches. When we read about the wonderful speeches which great orators used to make, we must remember that if those speeches were made after dark the halls had to be lighted up with candles. When balls or receptions were given, there was no better light than that given by a few candles. Yet there was gas to be had then as there is now, if men had only known how to get it and use it.

WHAT IS THE STORY OF DÆDALUS?

Dædalus, the legendary son of an Athenian king, is represented as having been something of a genius in several ways. An architect, a sculptor, and richly gifted in all arts, he also is supposed to have invented the ax, the level and the wedge; and to have introduced the use of sails. His achievements suggest how old the idea of mechanics is.

Exiled at the court of King Minos in Crete, he there built the famous labyrinth, a vast inclosure arranged in such a puzzling way that those who entered could not find a way out. The unfortunate Dædalus was the first victim of his own invention. The king put him and his son Icarus into the labyrinth. But nothing defeated the inventor. If there were walls throughout, there was no roof to the maze, so why not fly out by the top? The story is that the ingenious artist made wings, which he fixed with wax to his son's shoulders and to his own, and thus they rose into the air and escaped. But the adventure was fatal to Icarus. Too ambitious, he wished to get near the sun, and then, the wax melting, his wings came off and he fell right into the sea. The father succeeded in alighting in Sicily, but the loss of Icarus broke his heart, and he died, too. Icarus might be the patron of our modern airmen.

WHY DO WE PUT A SPOON IN A GLASS BEFORE POURING IN HOT WATER?

When we pour hot water into a glass, the heat may sometimes expand the inside of the glass too quickly and break the glass. By putting in a spoon, which is a good conductor, we transfer some of the heat from the water to the spoon, and so reduce the risk of breakage. A copper or silver or gold spoon will be best, but any kind of metal spoon will do, for all metals are good conductors of heat. But sometimes a glass will break, of course, in spite of this precaution being taken.

WHY IS THE UNITED STATES OFTEN CALLED UNCLE SAM?

The use of the name Uncle Sam for the United States has been common for over a hundred years. No one knows for certain how it began, but here is an explanation which appeared in print about 1840, and may be true. The story goes that a contractor named Elbert Anderson was furnishing some supplies for the United States army during the War of 1812. On the barrels and boxes were stamped his initials E. A., and U. S. for the United States. Some one asked what these letters meant and a wag, for a joke, answered that he supposed they meant "Elbert Anderson and Uncle Sam," meaning Samuel Wilson, an old gentleman who was the local inspector of army supplies.

Whether this is how the use began no one really knows, but it soon spread over the country. After a time Uncle Sam was pictured as a tall slender old gentleman with a thin beard upon his chin, dressed in old-fashioned clothes with a white or gray tall hat. Sometimes the clothes are made of American flags. Now this figure is recognized everywhere in the world as representing the United States, just as the stout figure of John Bull is accepted as representing England. Neither looks very much like the average American or Englishman you may know, but they are generally accepted, nevertheless.

WHAT MAKES A LEAD PENCIL WRITE?

If the pencil were made of lead, or almost any other metal, it would not write well. Nearly all metals are too hard to mark paper—that is, to rub away against paper so as to leave marks; and there are no metals whose colors would show well against paper. A "lead" pencil is made up of tiny crystals of carbon. This form of carbon is called graphite, from the Greek word for "writing." The crystals are small, and of such a shape that they can easily be rubbed away from one another.

If there were no such thing as friction, the pencil would not write. The power of friction, or rubbing, depends on the force with which the rubbing surfaces are pressed against each other; so that the firmer and harder we press with our pencil the more graphite is rubbed down by friction on to the paper to record the track of our pencil.

**WHY DOES A CRUST FORM
ON BOILED MILK?**

The crust that forms on boiled milk is a valuable chemical substance. It is a protein, or albumin, and is called "lact-albumin," from the Latin word for "milk." It has the property of turning solid, or clotting, when it is boiled, and then it floats on the top of the milk and forms the crust which so many people dislike and throw away. Yet it has special advantages.

The life of many a baby that cannot digest the other protein of milk is saved by the use of this lact-albumin. When milk has rennet added to it, forming what we call curds and whey, the other protein of the milk is clotted and helps to form the curd; but in this case the lact-albumin is not clotted, and remains liquid in the whey. That is why it is sometimes called whey-albumin. Babies and invalids that are unable to digest any other kind of protein—and without some protein no one can live—can almost always digest whey and its albumin. Therefore, to throw away the skin that forms on boiled milk is a waste of one of the best things in the milk.

**WHY CAN WE NOT SEND A LETTER
WITHOUT A STAMP ON IT?**

There is no reason why we should not send all our letters without stamps on them, provided that we could find some hundreds of thousands of people to do the work of postmen and clerks and post-office officials and railway employees, and could get other people to make and maintain railways and engines, and dig coal to drive engines—and a few other things like that—all without payment. We write a letter and drop it in a box, and it reaches our friends a hundred miles away, or perhaps across the earth, and we think no more about it. But an enormous amount of labor is required to take our letter. If we think of sending a letter to Europe, we must include all the work of the men who make the ships, and the sailors who work them, and the people who make the harbors. If these things did not exist, it would cost thousands of dollars to send a letter across the world.

But as millions of people have letters to send, and as we can always count on their continuing to want to send letters, preparations can be made, and their millions and millions of fees, put together, will pay for everything, and enable any

one of them to send a letter thousands of miles for a very small sum. So the question we should have asked is not, Why can we not send a letter without a stamp on it? but Why does it not cost ten thousand dollars to send a letter?

**WHAT CAUSES THE ANNOYANCE
CALLED CHILBLAINS?**

Chilblains are really a mild kind of frostbite, and they are due to the same cause as frostbite. Cold is the beginning of it, but it is not merely the cold that does the harm; it is really starvation—starvation of a finger or a toe, or the nose, or the ear, because it is not supplied with enough blood. The cold acts by shutting up the blood-vessels, so that the toe, or whatever it is, is starved. In what we call a chilblain, the toe or finger is by no means starved of blood; on the contrary, it is warm and red. But it has been starved, and now it has an extra supply of blood to make good the damage. The surest way of getting chilblains is to wear tight shoes or gloves, to take no exercise, to get exposed to cold, and to keep hands and feet warm by holding them before a fire, allowing them to get really cold before or after doing so.

Children are specially liable to chilblains, because their tissues are delicate and will not stand a little starvation so well as the tissues of a grown-up.

**ARE WE CREATING MANY
NEW DISEASES?**

The answer to this most important question is probably No. The more we learn by reading the old authors, by studying skeletons and mummies, and so on, the more certain are we that our ancestors suffered from our diseases, and even from diseases that we have not.

Our cities, with their overcrowding, may mean that diseases spread easily, but the diseases are not new. Dirt makes disease, but our ancestors were dirtier than we are. They had no such supplies of pure water as our towns have; they drank impure water and they had no drainage. We find proof that the diseases which are most deadly to-day, such as consumption, were well known and terribly common two thousand and even five thousand years ago. If we create new diseases, they are generally diseases of the mind, due to the unnatural lives that many of us live; but doubtless, when any of our ancestors lived these foolish lives, they suffered as we do.

WHY DOES A HORSE WEAR BLINKERS?

The curious flaps of leather known as blinkers, placed at the side of a horse's eyes, restrict its field of vision. It can see only straight ahead, and cannot see what is happening to the right and left of it. In this way the horse is supposed to be protected from sights which might frighten it. But it is very doubtful whether the blinkers really have this effect. Some people think they do more harm than good, and it is certain that in some cases a horse becomes less frightened if it is allowed to see a noisy object which has alarmed it, for, of course, no blinkers or anything else can save the horse from hearing an alarming sound.

WHY DOES HEAT MAKE PAPER CURL UP?

There is a certain amount of water in all ordinary things. The amount of water in a sheet of paper makes it heavy. We know how heavy and limp a piece of quite damp paper is. If we heat the paper we drive the water away; the water is changed into a gas, which passes off into the air. Spaces in the paper that were filled with water before are now filled up with air, which is very much lighter. If there are any forces in the paper tending to make it curl up, they are now free to act, for they have not to lift the weight of water that was previously in the paper.

Also, we must remember that paper, like almost everything else, shrinks when it is cooled and expands when it is heated. If the change in temperature occurs at exactly the same rate in every part of a thing, then, as its size alters, its shape will not alter; but if one side of a thing gets hot or cold at a slightly different rate from the other side of it, its shape will change, and if it is thin and flat, we shall notice the change by finding it curl up.

WHAT WAS THE ORIGIN OF THE ARCH OF TRIUMPH?

It has been thought that the first idea of the arch came from the vault formed by the branches of two trees meeting. The origin of the Arch of Triumph standing by itself must have been an imitation of arches temporarily erected for the ceremonial triumphs with which the Romans celebrated their victories. All that could recall the glory of recent war, trophies, pictures of battles, and, above all, inscriptions to the honored conqueror, had a place in the decorations. But as

the empire grew, the victories were so often renewed that the Romans built strong arches to serve for all triumphs, and this idea has been handed down to us. Many triumphal arches are found in Italy; France has several Roman arches in Provence. The Paris arch was built to Napoleon's glory. The Marble Arch in London and the Washington Arch in New York are also based on Roman models.

WHAT DOES THE WORD ALCAZAR MEAN?

Alcazar comes from an Arabian word meaning "palace." The name was particularly given to the Arab palaces built in Spain under Moorish rule. Although several times restored, the Alcazar that gives us the best idea of what those gorgeous buildings could be, is that of Seville, with its grounds, its beautiful gardens and its fountains. Its rooms, especially the famous Hall of the Ambassadors, have retained the rich coloring of the time when it was built. The Toledo Alcazar, built as a citadel in the seventh century, was also very fine, but a great fire destroyed it in 1887. Another, the Segovia Alcazar, many times restored in the course of ages, has now been turned into artillery barracks. But the most famous Alcazar among all was that of Medina-el-Zamra, erected in 935 near Cordova. The poets of the time celebrated it as a marvel. Unhappily, it was entirely destroyed some centuries ago.

Alcazar is often used now as a name for a theatre, or any public building in which the decoration recalls those of the Arab palaces.

WHY DOES A TREE STOP GROWING?

We might ask the same question of men, or horses, or birds, or any other living creature. The reason is that the growth of living things is not like the growth of a snowball or a crystal. Such things simply go on growing the more material they get; there is nothing inside them limiting their growth. But every living creature has the marks within it of something that has a purpose. We may say that living things grow to the size which suits them best; when that is done, they stop growing and maintain themselves as long as they can. Every living creature grows to the shape and the size which it is meant to grow to.

THE NEXT WONDER QUESTIONS ARE ON PAGE 3473.

A FAMOUS BOOK ABOUT A FAMOUS VOYAGE

RICHARD HENRY DANA was a member of a distinguished family of Boston, and, as he tells us, made the voyage around the Horn for his health while a student at Harvard. His book tells of the life of a common sailor, of the strange Spanish land of California, of the manners and customs of the people, and of his thoughts and feelings on the voyage. Sailing ships had almost disappeared when the World War began, but it has called some of them back. This book is one of the best descriptions we have of life on one of these vessels in the first half of the last century. After Mr. Dana's voyage he returned to his studies, was graduated at Harvard, and later became a famous lawyer. He wrote a book for sailors telling them what their rights were. And to the end of his life he was interested in the sea and in sailors. This book is read as much to-day as when it was first published.

TWO YEARS BEFORE THE MAST

RICHARD HENRY DANA, when an undergraduate at Cambridge, determined to take a long sea voyage in order to cure a weakness of the eyes which threatened to spoil his career. Accordingly he shipped on the brig *Pilgrim*, bound from Boston round Cape Horn to the western coast of North America—a long and tedious voyage.



the regular duties of sea life.

He soon realized what a busy life it was that he had adopted. The discipline of the ship required every man to be constantly at work when he was on deck, except at night and on Sundays. When not actually engaged in sailing the ship, the vessel was overhauled and repaired by the men.

Dana was utterly new to the sea, and felt very keenly all the discomforts of a sailor's life. At first he lived in the steerage, which was filled with coils of rigging, spare sails and old junk. There were no berths built into the sides and no nails for their clothes. No light was allowed to find anything with, and the rolling of the ship pitched everything about in great confusion. In the darkness and noise the new sailor had the added misery of seasickness. While in this state he was first ordered aloft to reef topsails. The wonder is that he did not pitch headlong upon the deck. So matters continued for two or three days till the weather bettered. Dana was able then to take good solid rations of salt beef and biscuit. From that time he was a new being. By degrees the steerage names of things on board became familiar to him, and he entered upon

Through the late summer and autumn the ship ran on with few adventures upon her southerly course toward Cape Horn. Once they were chased by pirates for a day and a night. But they escaped by spreading more sail and putting out all lights on board at nightfall. In the latitude of the *La Plata* the first of the gales struck the brig. Early in November they sighted the Falkland Islands, as they ran between them and the mainland of Patagonia. They were now in the region of Cape Horn and saw the Magellan Clouds and the Southern Cross, the latter composed of the brightest stars in the heavens.

All were prepared for the dreaded Cape weather and it did not delay its onslaught upon them. A fine specimen of it appeared in a great cloud of dark slate color which drove upon them from the southwest. In an instant the sea was lashed into a fury and it be-

came almost as dark as at night. The sailors did their best to take in sail. But a cold sleet and driving hail almost froze them to the rigging. The sails were stiff and wet, and the ropes and rigging covered with sleet and snow. The little brig plunged madly into this tremendous sea, and wave upon wave rushed in through the portholes and broke over the bows.

An order was given to furl the jib, the sail forward of the foremast, and two of the men had to go out on the bowsprit. An old Swede, the best sailor on board, sprang forward and Dana followed him. As the vessel plunged downward the men were submerged in the sea up to their chins, and for some time could do nothing but hold on. No help came to them from the decks. The fury of the wind and the breaking of the seas against the bows prevented any shout from being heard. At last they succeeded in furling the jib, after a fashion, and came in to find all snug and the watch gone below.

Day after day passed with but little change in the weather. The men's clothes were all wet through; they had no means of drying them, and could only change from wet to wetter. They could not read or work below, for the hatches were closed and everything black and dirty. Their only relief was to come below when the watch was out, wring out their wet clothes, hang them up, and turn in and sleep until the watch was called again.

At night and morning they were allowed a tin pot full of hot tea sweetened with molasses. This, bad as it was, was the only warm food they had, and with their sea biscuit and cold salt beef comforted them somewhat. One of their shipmates, heavily dressed, with heavy coils of rope around his neck, fell overboard. He could not swim and probably sank immediately. This depressed the sailors seriously. The man had been a fine seaman and a good shipmate, and was seriously missed.

At the end of November they sighted land and made out the island of Juan Fernandez rising like a deep blue cloud out of the sea. The captain and some of the crew went ashore to get fresh water. They found that the island was used by the Chilian Government as a convict settlement, with a governor, a priest, half a dozen taskmasters, and a body of soldiers to keep the prisoners in order.

They saw neither land nor sail from the time of leaving Juan Fernandez until their arrival in California. Dana's lot was lightened by being allowed to shift his berth from the steerage into the fore-castle, and bunk and mess with the crew forward. The weather in the Pacific was fair, and the climate never extremely hot or cold. At last, early in January, they came to anchor in the spacious bay of Santa Barbara after a voyage of one hundred and fifty days from Boston.

The brig expected to trade upon the coast of Upper California. But instead of going first to Monterey, the seat of government and only custom-house, where the cargo had to be entered, the captain had orders to put in at Santa Barbara. He had to wait for the agent, who lived there and transacted all the business for the firm. Accordingly, as soon as they had picked him up, they set off for Monterey. The weather had changed again, and for four days of rainy, stormy weather they beat up the coast against a violent head wind. After some delay they entered the Bay of Monterey and found good anchorage. There they could lie safe from the "southeasters," which were the chief difficulty on this coast.

Then the trading began. A room was fitted up in the steerage, and the men, women and children were rowed out to the vessel to look at the cargo and make their purchases. The Pilgrim's cargo consisted of everything under the sun—from Chinese fireworks to English cart-wheels. Everything was sold at high prices, partly because of the heavy duties laid upon imports and partly because of the great expense of the long voyage. The ship's crew was busy from daylight until dark in the boats, carrying goods and passengers. For everybody made a holiday to come on board and see the strange vessel, even if they only bought a packet of pins.

As soon as the trade slackened at Monterey the brig left for Santa Barbara. There the crew had their first glimpse of what taking up their own cargo would mean. They had come for hides, and had supposed when they left Boston that it was on a voyage of eighteen months or two years at most. It was found that the hides were scarce and were yearly becoming scarcer, and it would take a year at least to collect their own cargo. In addition, they learned for the first

time that they had also to collect a cargo for a large ship belonging to the same firm which was soon to come up the coast. The gloomy prospect of two or three years at the end of the earth, and in a country where there was no law, hung over the ship, and the men became miserable and indifferent. Trouble was brewing and nothing went right. The captain quarreled with the cook and disputed with the mate. Finally he tied two men up to the shrouds and cruelly flogged them for fancied insolence. After this the comfort of the voyage was at an end.

The book is one of the best descriptions we have of life in California under Mexican rule, for the state did not become a part of the United States until fifteen years after Dana's voyage. Scattered through it there are many incidents of persons and places which enable us to understand the country of those days, when there were few white men in the whole region. Those of unmixed Spanish blood called themselves Castilians, and were very proud of the fact. Most of them, however, were part Indian. The Indians themselves were little more than slaves. Little farming was done, but there were great herds of cattle and horses. A good horse could be bought for ten dollars or less, and the cattle were valued chiefly for their hides and tallow. Thousands were killed for these alone, and of course fresh meat was sold for almost nothing.

For some time the brig cruised up and down the coast, collecting hides till she had as many as her hold would carry. She then sailed to San Diego, where the firm had a hide-house built to hold forty thousand hides. The hides came rough and uneven from the vessels and were piled outside the house. Then they were carried through a regular course of pickling, drying and cleaning, in order that they might keep during a warm voyage. For this purpose an officer and some of the crew were left ashore, and Dana was among the shore gang. He and the others made their home in one corner of the large hide-house, which was boarded off. In this place there were berths, a table, a small locker for pots and spoons, and a hole cut to let in the light. The officer had a similar small room where he lived in state.

His companions on the beach, other

than the ship's crew, were, for the most part, Sandwich Islanders, or, as they called themselves, "Kanakas." Dana liked these men for their kind-heartedness and intelligence. Soon he learned to speak their language, though they had no books and very little education. Whatever one of these men had he shared with the others—money, food, clothes, even to the last pipe of tobacco to put in their pipes.

The men turned out every morning at the first signs of daylight. Allowing a short time for breakfast, they got through their labor between one and two o'clock. There was a regular amount of work to do each day, and when that was done, the time was their own. Just before sundown the dry hides were beaten and put in the house, and the others in their various stages of preparation were covered over. The work was hard, disagreeable and tiring, but the men became hardened to it, and the feeling of freedom made up for much.

Through the season other vessels came to the beach to discharge or pick up hides. Their crews came ashore every evening and made a varied gathering from almost every country under the sun. The Pilgrim, too, from time to time brought fresh cargoes of hides, and the news that the company's large ship, the Alert, had arrived. Their own captain had taken charge of her and gone up to Monterey with her.

Dana was becoming very anxious as to his own future. If he had to stay with the Pilgrim for four years, his chances of another career would be gone forever. He would be a sailor in tastes and nautical knowledge, and his companions at college would have gone on and left him far behind. He became eager, as indeed were all the crew, though for different reasons, to get home. But if the worst came to the worst and he was forced to stay at sea, the best he could do was to qualify himself for an officer. For that purpose he must learn practical seamanship on board ship, and must leave his hide-curing and join in the cruising upon the coasts. When the Alert arrived, he obtained permission from the captain to exchange with one of the crew, and accordingly entered upon a new life at sea once more. The following description of a sailor's life is given in Dana's own words.

THE LIFE OF THE COMMON SAILOR

Tuesday, Sept. 8th. This was my first day's duty on board the ship; and though a sailor's life is a sailor's life wherever it may be, yet I found everything very different here from the customs of the brig Pilgrim. After all hands were called, at daybreak, three minutes and a half were allowed for every man to dress and come on deck, and if any were longer than that, they were sure to be overhauled by the mate, who was always on deck, and making himself heard all over the ship. The head-pump was then rigged, and the decks washed down by the second and third mates; the chief mate walking the quarter-deck and keeping a general supervision, but not deigning to touch a bucket or a brush. Inside and out, fore and aft, upper deck and between decks, steerage and forecastle, rail bulwarks, and water ways, were washed, scrubbed and scraped with brooms and canvas, and the decks were wet and sanded all over, and then holystoned.

The holystone is a large, soft stone, smooth on the bottom, with long ropes attached to each end, by which the crew keep it sliding fore and aft, over the wet sanded decks. Smaller hand-stones, which the sailors called "prayer-books," are used to scrub in among the crevices and narrow places, where the large holystone will not go. An hour or two, we were kept at this work, when the head-pump was manned, and all the sand washed off the decks and sides. Then came swabs and squilges; and after the decks were dry, each one went to his particular morning job.

There were five boats belonging to the ship—launch, pinnace, jolly-boat, larboard quarter-boat, and gig—each of which had a coxswain, who had charge of it, and was answerable for the order and cleanness of it. The rest of the cleaning was divided among the crew; one having the brass and composition work about the capstan; another the bell, which was of brass, and kept as bright as a gilt button; a third, the harness-cask; another the man-rope stanchions; others, the steps of the forecastle and hatchways, which were hauled up and holystoned.

Each of these jobs must be finished before breakfast; and in the meantime, the rest of the crew filled the scuttle butt,

and the cook scraped his kids (wooden tubs out of which the sailors eat) and polished the hoops, and placed them before the galley, to await inspection. When the decks were dry, the lord paramount made his appearance on the quarter-deck, and took a few turns, when eight bells were struck, and all hands went to breakfast.

Half an hour was allowed for breakfast, when all hands were called again, the kids, pots, bread-bags, etc., stowed away; and this morning, preparations were made for getting under way. We paid out on the chain by which we swung; hove in on the other; catted the anchor, and hove short on the first. This work was done in shorter time than is usual on board the brig; for though everything was more than twice as large and heavy, the cat-block being as much as a man could lift, and the chain as large as three of the Pilgrim's yet there was a plenty of room to move about in, more discipline and system, more men and more good will. Every one seemed ambitious to do his best; officers and men knew their duty, and all went well.

As soon as she was hove short, the mate, on the forecastle, gave the order to loose the sails, and, in an instant, every one sprung into the rigging, up the shrouds, and out on the yards, scrambling by one another—the first up the best fellow—cast off the yard-arm gaskets and bunt gaskets, and one man remained on each yard, holding the bunt jigger with a turn round the tye, all ready to let go, while the rest laid down to man the sheets and halyards.

The mate then hailed the yards—"All ready forward?"—"All ready the cross-jack yards?" etc., etc.; and "Ay, ay, sir!" being returned from each, the word was given to let go; and in the twinkling of an eye, the ship, which had shown nothing but her bare yards, was covered with her loose canvas, from the royal-mast-heads to the decks.

Every one then laid down, except one man in each top, to overhaul the rigging, and the top-sails were hoisted and sheeted home; all three yards going to the mast-head at once, the larboard watch hoisting the fore, the starboard watch the main, and five light hands (of whom I was one), picked from the two watches, the mizzen.

The yards were then trimmed, the anchor weighed, the cat-block hooked on, the fall stretched out, manned by "all hands and the cook," and the anchor brought to the head with "cheerily, men!" in full chorus.

The ship being now under way, the light sails were set, one after another, and she was under full sail, before she had passed the sandy point. The fore royal, which fell to my lot (being in the mate's watch), was more than twice as large as that of the Pilgrim, and, though I could handle the brig's easily, I found my hands full with this, especially as there were no Jacks to the ship; everything being for neatness, and nothing left for Jack to hold on by, but his eyelids.

As soon as we were beyond the point, and all sail out, the order was given, "Go below the watch!" and the crew said that, ever since they had been on the coast, they had had "watch and watch," while going from port to port; and, in fact, everything showed that, though strict discipline was kept, and the utmost was required of every man, in the way of his duty, yet, on the whole, there was very good usage on board.

Each one knew that he must be a man, and show himself smart when at his duty, yet every one was satisfied with the usage; and a contented crew, agreeing with one another, and finding no fault, was a contrast indeed with the small, hard-used, dissatisfied, grumbling, desponding crew of the Pilgrim.

It being the turn of our watch to go below, the men went to work, mending their clothes, and doing other little things for themselves; and I having got my wardrobe in complete order at San Diego, had nothing to do but to read. I accordingly overhauled the chests of the crew, but found nothing that suited me exactly, until one of the men said he had a book which "told all about a great highwayman," at the bottom of his chest, and producing it, I found to my surprise and joy, that it was nothing else than Bulwer's Paul Clifford. This I seized immediately, and going to my hammock, lay there, swinging and reading, until the watch was out. The between-decks were clear, the hatchways open, and a cool breeze blowing through them, the ship under easy way, and everything comfortable. I had just got well into the story

when eight bells were struck, and we were all ordered to dinner.

After dinner came our watch on deck for four hours, and, at four o'clock, I went below again, turned into my hammock, and read until the dog-watch. As no lights were allowed after eight o'clock, there was no reading in the night-watch. Having light winds and calms, we were three days on the passage, and each watch below, during the daytime, I spent in the same manner, until I had finished my book.

I shall never forget the enjoyment I derived from it. To come across anything with the slightest claims to literary merit, was so unusual, that this was a perfect feast to me. The brilliancy of the book, the succession of capital hits, lively and characteristic sketches, kept me in a constant state of pleasing sensations. It was far too good for a sailor. I could not expect such fine times to last long.

While on deck, the regular work of the ship went on. The sail-maker and carpenter worked between decks, and the crew had their work to do upon the rigging, drawing yarns, making spun-yarn, etc., as usual in merchantmen.

The night-watches were much more pleasant than on board the Pilgrim. There, there were so few in a watch, that, one being at the wheel, and another on the lookout, there was no one left to talk with; but here, we had seven in a watch, so that we had long yarns, in abundance. After two or three night-watches, I became quite well acquainted with all the larboard watch.

The sail-maker was the head man of the watch, and was generally considered the most experienced seaman on board. He was a thoroughbred old man-of-war's-man, had been to sea twenty-two years, in all kinds of vessels—men-of-war, privateers, slavers, and merchantmen;—everything except whalers, which a thorough sailor despises, and will always steer clear of if he can. He had, of course, been in all parts of the world, and was remarkable for drawing a long bow. His yarns frequently stretched through a watch, and kept all hands awake. They were always amusing from their improbability, and, indeed, he never expected to be believed, but spun them merely for amusement; and as he had some humor and a good supply of

man-of-war slang and sailor's salt phrases, he always made fun.

Next to him in age and experience, and, of course, in standing in the watch, was an Englishman, named Harris, of whom I shall have more to say hereafter. Then, came two or three Americans, who had been the common run of European and South American voyages, and one who had been in a "spouter," and, of course, had all the whaling stories to himself. Last of all, was a broad-backed, thick-headed boy from Cape Cod, who had been in mackerel schooners, and was making his first voyage in a square-rigged vessel. He was born in Hingham, and of course was called "Bucketmaker."

The other watch was composed of about the same number. A tall, fine-looking Frenchman, with coal-black whiskers and curly hair, a first-rate seaman, and named John (one name is enough for a sailor), was the head man of the watch. Then came two Americans (one of whom had been a dissipated young man of property and family and was reduced to duck trousers and monthly wages), a German, an English lad, named Ben, who belonged on the mizzen top-sail yard with me, and was a good sailor for his years, and two Boston boys, just from the public schools. The carpenter sometimes mustered in the starboard watch, and was an old sea-dog, a Swede by birth, and accounted the best helmsman in the ship. This was our ship's company, besides cook and steward, who were blacks, three mates, and the captain.

The second day out, the wind drew ahead, and we had to beat up the coast; so that, in tacking ship, I could see the regulations of the vessel. Instead of going wherever was most convenient and running from place to place, wherever work was to be done, each man had his station. A regular tacking and wearing bill was made out.

The chief mate commanded on the fore-castle, and had charge of the head sails and the forward part of the ship. Two of the best men in the ship—the sail-maker from our watch, and John, the Frenchman, from the other, worked the fore-castle. The third mate commanded in the waist, and with the carpenter and one man, worked the main tack and bowline; the cook, *ex officio*, the fore sheet, and the steward the main. The

second mate had charge of the after yards, and let go the lee, fore and main braces. I was stationed at the weather cross-jack braces; three other light hands at the lee; one boy at the spanker-sheet and guy; a man and a boy at the main top-sail, top-gallant, and royal braces; and all the rest of the crew—men and boys—tallied on to the main brace.

Every one here knew his station, must be there when all hands were called to put the ship about, and was answerable for every rope committed to him. Each man's rope must be let go and hauled in at the order, properly made fast, and neatly coiled away when the ship was about. As soon as all hands are at their stations, the captain, who stands on the weather side of the quarter-deck, makes a sign to the man at the wheel to put it down, and calls out, "Helm's a lee!" "Helm's a lee!" answers the mate on the fore-castle, and the head sheets are let go. "Raise tacks and sheets!" says the captain; "tacks and sheets!" is passed forward, and the fore tack and main sheet are let go.

The next thing is to haul taut for a swing. The weather cross-jack braces and the lee main braces are each belayed together upon two pins and ready to be let go, and the opposite braces hauled taut. "Main top-sail haul!" shouts the captain: the braces are let go; and if he has taken his time well, the yards swing round like a top; but if he is too late, or too soon, it is like drawing teeth.

The after yards are then braced up and belayed, the main sheet hauled aft, the spanker eased over to leeward, and the men from the braces stand by the head yards. "Let go and haul!" says the captain; the second mate lets go the weather fore braces, and the men haul in to leeward. The mate, on the fore-castle, looks out for the head yards. "Well, the fore top-sail yard!" "Top-gallant yard's well!" "Royal yard too much!" "Haul in to windward! So! well *that!*" "Well *all!*"

Then the starboard watch board the main tack, and the larboard watch lay forward and board the fore tack and haul down the jib sheet, clapping a tackle upon it, if it blows very fresh. The after yards are then trimmed, the captain generally looking out for them himself. "Well the cross-jack yard!" "Small pull the main top-gallant yard!" "Well

that!" "Well the mizzen top-sail yard!" "Cross-jack yards all *well!*" "Well all aft!" "Haul taut to windward!" Everything being now trimmed and in order, each man coils up the rigging at his own station, and the order is given—"Go below the watch!"

During the last twenty-four hours of the passage, we beat off and on the land, making a tack about once in four hours, so that I had a sufficient opportunity to observe the working of the ship; and certainly, it took no more men to brace about this ship's lower yards, which were more than fifty feet square, than it did those of the Pilgrim, which were not much more than half the size; so much depends upon the manner in which the braces run, and the state of the blocks; and Captain Wilson, of the Ayacucho, who was afterward a passenger with us, upon a trip to windward, said he had no doubt that our ship worked two men lighter than his brig.

Friday, Sept. 11th. This morning, at four o'clock, went below, San Pedro point being about two leagues ahead, and the ship going on under studding-sails. In about an hour we were waked up by the hauling of the chain about decks, and in a few minutes "All hands ahoy!" was called; and we were all at work, hauling in and making up the studding-sails, overhauling the chain forward, and getting the anchors ready.

"The Pilgrim is there at anchor," said some one, as we were running about decks; and taking a moment's look over the rail, I saw my old friend, deeply laden, lying at anchor inside of the kelp.

In coming to anchor, as well as in tacking, each one had his station and duty. The light sails were clewed up and furled, the courses hauled up, and the jibs down; then came the top-sails in the buntlines, and the anchor let go. As soon as she was well at anchor, all hands lay aloft to furl the top-sails; and this, I soon found, was a great matter on board this ship; for every sailor knows that a vessel is judged of, a good deal, by the furl of her sails. The third mate, sail-maker, and the larboard watch went upon the fore top-sail yard; the second mate, carpenter, and the larboard watch upon the main; and myself and the English lad, and the two Boston boys, and the young Cape Cod man, furled mizzen top-sails.

This sail belonged to us altogether, to reef and to furl, and not a man was allowed to come upon our yard. The mate took us under his special care, frequently making us furl the sail over, three or four times, until we got the bunt up to a perfect cone, and the whole sail without a wrinkle.

As soon as each sail was hauled up and the bunt made, the jigger was bent on to the slack of the buntlines, and the bunt triced up, on deck. The mate then took his place between the knight-heads to "twig" the fore, on the windlass to twig the main, and at the foot of the mainmast for the mizzen; and if anything was wrong—too much bunt on one side, clews too taut or too slack, or any sail abaft the yard—the whole must be dropped again.

When all was right, the bunts were triced well up, the yard-arm gaskets passed, so as not to leave a wrinkle forward of the yard—short gaskets with turns close together.

From the moment of letting go the anchor, when the captain ceases his care of things, the chief mate is the great man. With a voice like a young lion, he was hallooing and bawling, in all directions, making everything fly, and at the same time doing everything well. He was quite a contrast to the worthy, quiet, unobtrusive mate of the Pilgrim: not so estimable a man, perhaps, but a far better mate of a vessel; and the entire change in Captain T——'s conduct, since he took command of the ship, was owing, no doubt, in a great measure, to this fact.

If the chief officer wants force, discipline slackens, everything gets out of joint, the captain interferes continually; that makes a difficulty between them, which encourages the crew, and the whole ends in a three-sided quarrel. But Mr. Brown (the mate of the Alert) wanted no help from anybody; took everything into his own hands; and was more likely to encroach upon the authority of the master, than to need any spurring.

Captain T—— gave his directions to the mate in private, and except in coming to anchor, getting under way, tacking, reefing top-sails and other "all-hands work," seldom appeared in person. This is the proper state of things; and while this lasts, and there is a good understanding aft, everything will go on well.

Having furled all the sails, the royal

yards were next to be sent down. The English lad and myself sent down the main, which was larger than the Pilgrim's main top-gallant yard; two more light hands, the fore; and one boy, the mizzen. This order we always kept while on the coast; sending them up and down every time we came in and went out of port. They were all tripped and lowered together, the main on the starboard side, and the fore and mizzen to port. No sooner was she all snug, than tackles were got up on the yards and stays, and the long-boat and pinnace hove out. The swinging booms were then guyed out, and the boats made fast by geswarps, and everything in harbor style.

After breakfast, the hatches were taken off, and all got ready to receive hides from the Pilgrim. All day, boats were passing and repassing, until we had taken her hides from her, and left her in ballast trim. These hides made but little show in our hold, though they had loaded the Pilgrim down to the water's edge.

This changing of the hides settled the question of the destination of the two vessels, which had been one of some speculation to us. We were to remain in the leeward ports, while the Pilgrim was to sail the next morning for San Francisco.

After we had knocked off work, and cleared up decks for the night, my friend S—— came on board, and spent an hour with me in our berth between-decks. The Pilgrim's crew envied me my place on board the ship, and seemed to think that I had got a little to windward of them; especially in the matter of going home first. S—— was determined to go home in the Alert, by begging or buying; if Captain T—— would not let him come on other terms, he would purchase an exchange with some one of the crew. The prospect of another year after the Alert should sail, was rather "too much of the monkey."

We must conclude Dana's own vivid description of his life afloat and ashore. In brief form we shall tell the story of his experiences until he landed safely in Boston harbor.

The Pilgrim was not returning to Boston. But Dana knew that the owners, through the influence of his friends, had arranged for him to go back in the Alert, and his heart was easy. One day he re-

ceived a summons into the cabin, and going aft, found his own captain and the agent there. Captain T—— turned to him.

"Dana, do you want to go home in the ship?" he asked.

"Certainly, sir," Dana replied. "I expect to go home in the ship."

"Well," said he, "you must get someone to go in your place on board the Pilgrim." Such a blow was so unexpected that for a moment Dana was completely taken aback. As soon as his wits came to him he told the captain plainly that he had a letter in his chest informing him that the owners had written the captain to send him home in the Alert. His firmness enraged the captain, and had he been friendless and poor, there is no doubt that he would have been condemned to spend two more years in California.

With over forty thousand hides, thirty thousand horns, and barrels of otter and beaver skins, the Alert pulled up anchor and set sail. The ship was only half manned, and loaded so deep that every heavy sea washed her fore and aft. The forecastle leaked, and the journey round the Horn had to be made in the depth of winter. Yet the men made the best of it, though drenching rain kept them in a state of perpetual discomfort, and scurvy made its ravages upon the crew. All fresh food soon gave out, and things were beginning to look bad when they hailed a brig outward bound from New York. She gave them potatoes and onions, and these arrested the progress of the dread disease. Scurvy is hardly known these days, but then it was common. It is caused by a lack of fresh fruits or vegetables. Then salt provisions were the usual food, and prisons and ships often had many cases. Now fresh meat can be carried in the ice-chest, and more attention is paid to carrying vegetables.

As the ship neared the home port great preparations went ahead to make her trim. The rigging was set up and tarred, the masts stayed, the ship scraped and painted inside and out. After a voyage of one hundred and thirty-five days they came in sight of the home port. By night the ship lay snug, with all sails furled, safe in Boston harbor, the long, perilous voyage ended.

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 3527.



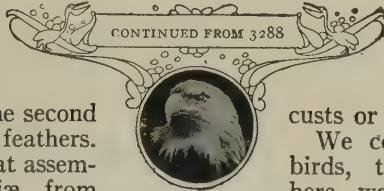
A Swift on its nest.

PECKERS, HUMMING-BIRDS AND HORNBILLS

WE took leave of the perching birds proper on page 3288, and here we make our bow to the second Order in the world of feathers. We have come to a great assembly named the Picariæ, from *picus*, the Latin word for "woodpecker." We shall talk of many birds besides the true woodpeckers in this chapter, but we shall see in all the present group certain characteristics of which the woodpeckers are the type. Nearly all the birds in the present group build their nests in holes in trees or banks, and their eggs are a plain or creamy white.

We begin with the Jacamars, a South American family, though we must confess that little is known of their habits of nesting and bringing up their young. But travelers are familiar with the shiny Green Jacamar with his bluish crown. The brilliant Red-tailed Jacamars sit quietly till a flying insect heaves in sight. Then they launch themselves with the suddenness of a coiled spring uncoiling. The Great Jacamar shows ten and a half inches of lustrous green, chestnut and white.

Next to them rank the Puffbirds which sit quietly for hours with feathers spread. They look somewhat like dull kingfishers, but are very different in habit. Some have been seen to nest



in the hollow of a living bamboo and to have their crops full of noxious locusts or other injurious insects.

We come now to the type birds, the woodpeckers, and here we may utter a little whoop of triumph. Woodpeckers peck. They creep about trees, and hit the trunks resounding whacks with their hard, tough bills; and where they have been at work we may find little heaps of chips, and holes in trunks where no hole was visible before.

Now, any sort of offense, imaginary or real, suffices to place a bird under sentence of death. Farmers pronounce sentence of outlawry against the woodpeckers, great and lesser. The charge for which the poor birds were indicted was that they tore open the trunks of fine trees, and even ripped open telegraph posts, in order to make nests. A charge has only to be repeated often enough to be believed, and so this one was. We grew to believe the woodpeckers pests of our woodlands and to proscribe them as little villains. But wise heads doubted, and expert watchers were set to work to learn what the woodpecker meant by his activities.

The result was a vindication of the birds. It is true that they did dig open trees; they did at times assail the

QUAINT AND LOVELY BIRDS OF MANY LANDS



The Elate Hornbill.



The Toucan.



The Cuban Trogon.



The Motmot.



The Humming-birds of the tropical world.

A FLOCK OF BIRDS WITH CURIOUS BEAKS



The Black Hornbill.



The Nepalese Hornbill.



The Rhinoceros Hornbill.



The Sacred Kingfisher.



The Frogmouth.



The Laughing Kingfisher.



The Abyssinian Ground Hornbill.

telegraph poles. But in every case it was to search for insects secreted within; in every case the wood attacked by the birds had previously been attacked by disease or fungus. Rot had come with the entry of the insects on which the birds feed, and it was for these insects alone that the woodpeckers pecked. In no single instance did the watchers find a sound tree or sound telegraph pole attacked. Woodpeckers have a great mission in life; it is to find wood-hidden insects and convert them into woodpecker banquets, and the task leaves no time for the fun of tearing open sound trees and telegraph poles.

The eyes of birds are keener than ours. They detect rot and decay which escape our notice, and by laying open the wounds they reveal dangers to the woodman. Follow the woodpecker, and either cut or treat the tree he taps open, and the rest of the trees will escape infection from the one in which disease is germinating. Instead of killing woodpeckers we ought to honor them as guides to the safeguarding of our woods.

THE WONDERFUL TONGUE AND STRONG BEAK OF THE WOODPECKER

Of course the bird does not make all his holes in order to excavate insects. Some of them serve for the reception of the eggs. But the extraction of his food is a matter of great interest. It is performed by a wonderful tongue which can be protruded far beyond the limits of the beak. This tongue is long and worm-like, but pointed and barbed at the tip, and is received into a sheath which runs like a canal around the top of the skull.

The beak of the bird is a two-halved chisel, which rips and digs as it is applied with great force by the bird's powerful head and neck. Then, to complete the marvel, the extraordinary tongue, when it does shoot out, is found coated with a substance as gluey as that which enables a frog to snap up a worm or a butterfly. Fine climbers, the greater number of woodpeckers have the tail feathers stiff and elastic, as a support to them when creeping and running about the upright trunks of trees.

It is a tremendous family—about 350 species—of many patterns, many lands, many sizes. There are Golden, Gray-headed, Red-headed, Pied, Black, Bay and Rufous woodpeckers, Great Spotted

and Great Black, and Pigmy woodpeckers known as the African cardinals.

There are many species of American woodpeckers, which you will find described in the chapters on Birds of North America. The Ivory-billed and the Pileated are rare and will soon be extinct, but the Downy Woodpecker, the Red-headed and several other species are still fairly common. Of course, as forests are cut down they will tend to disappear.

Some species show a certain foresight not usual with birds. The California Woodpecker makes holes in trees and packs them with acorns, and the eastern Red-headed packs acorns into the crevices in the bark. Spiders, of course, store food, and squirrels and other rodents also, but these woodpeckers and the shrike are among the few birds which provide for the future.

A BIRD WITH THE VOICE AND MOVEMENTS OF A SERPENT

A European bird which is often mistaken for a small woodpecker as it runs with rapid creeping gait along the upright trunk of a tree, licking up ants and other insects, is the strange Wryneck. Seven inches in length, with the upper reddish gray feathers striped with little wavy black lines, this summer visitor is a masterpiece of adaptation to surroundings, difficult to see at all when it is still.

It derives its name from the strange motions of its neck, which twists and writhes as the head darts after food, with the motion of a small serpent. There is something decidedly like a reptile about the wryneck, notably the alarming hissing sound it utters when its nest is approached or when the bird is handled.

A hole in an old apple tree in a garden visited by thousands of people every year was firmly held to be the retreat of a snake, so fierce was the hissing issuing from it; but it proved to be only poor little mother wryneck uttering her defense of the eggs she was brooding in the hole.

"Cuckoo's mate" is the familiar English name of the wryneck. The title arises from the fact that if the wryneck and the cuckoo do not arrive together, the lesser bird's sharp ringing note is sure to be shortly followed by the louder call of the cuckoo. The birds cover the same range of country, and where one is heard the other is not far distant in time or geography.

BIRDS AND THEIR HAUNTS



A Green Woodpecker.



Kingfisher and prey.



Woodpecker feeding young.



A fine group of Great Green Woodpeckers.



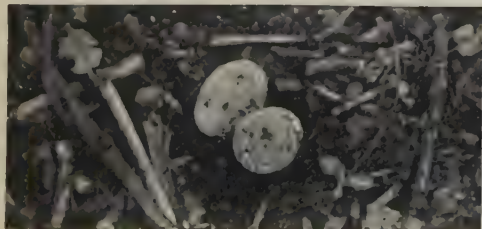
The Wryneck.



The Nighthawk, or Nightjar.



The Hoopoe.



The eggs of the Nighthawk.



The nesting chamber of the Kingfisher.

Bird pictures are by Messrs. Mortimer Batten, Brook, Chislett Coles-Finch, Crook, Pike, York & Son.

THE AFRICAN BIRD THAT LEADS MAN TO THE HONEY OF THE BEE

We must travel to Africa to find the nearest kin of these birds, the Honey-guides and Barbets. Of these the first-named has more than one claim to attention. As some birds take to buffaloes and rhinoceroses as partners, the honey-guides have constituted themselves allies of man.

Their food is honey and the larvæ of bees, and ages and ages of experience of African life have taught them that man likes honey too. Therefore the sight of a man in the vicinity of a bees' nest suggests an ultimate meal to the bird. So what more natural than that the little detective should fly to the spot where it knows bees live?

It does fly to them. It guides an observer to the spot, calling loudly as it flies, and perching from time to time to see that he is following. He reaches the nest and the bird comes in, jackal-wise, for the remnant of the spoil. The whole process is fascinating, but though there seems acute reasoning in the bird's actions, it seems probable that the sequence is purely instinctive and not associated with true thought.

Another notable feature of honey-guide life is that the bird is as notorious a trespasser on the nests of other birds as the cuckoo. The smaller species lay their eggs in the nest of the red-vented woodpecker, the small tinker barbet, or the pied barbet, while the large, White-backed Honey-guide selects for the purpose the nest of the banded barbet.

American barbets escape this fraud, for there are no honey-guides there, and the African victims need not move us to tears, for they are stout, heavy-billed birds, quite capable of defense. Entirely tropical, they are burnished by the sun of Africa, India and Central America into the utmost luxuriance of plumage. For their diet of fruit, flowers, shoots and insects—raw flesh too, at times—they have developed a powerful beak which is notched in some species, toothed in others, and in one American genus has the tip four-sided, as it were, so that the upper part fits into a sort of cradle.

South and Central America boast the nearest allies of the barbets on the other side from the honey-guides. These are the grotesque Toucans—gaudy, gorgeous creatures with enormous but very light

beaks, with extravagant coloration extending even to the naked parts of the body.

THE TOUCANS ARE CONFINED TO THE NEW WORLD

There are from fifty to sixty species of toucans, all confined to the tropical parts of the New World. The typical form is two feet in length. The plumage generally is black, but the throat is white, tinged with yellow and often edged with red. The beak is extraordinary. At least eight inches long and three inches high, the color is bright orange. Other species differ in color, but the beak is always large.

Such a bill might be expected to over-balance its owner, or be too heavy for the neck to sustain. Not so; the beak is exquisitely fashioned for lightness. The external horny covering is thin; the interior is a fine network of air-filled, bony fibres, marvelously designed to give the maximum of strength with the minimum of weight. The bill of the toucan is ugly, judged by our standards, but what human art could match the perfection of its efficiency?

SOME OF THE BEAUTIFUL AND LAZY COUSINS OF THE TOUCAN

The Trogons, cousins of the toucans, sixty in species, are natives of tropical America, Asia and Africa. They are just as gorgeous in the color of their fine, soft plumage, and their food of fruit and insects is similar. But they are better fliers than the toucans. Like a pretty woman whose sole attraction is in her face, they are slow and stupid in spite of their beauty, and cling, torpid and melancholy, to a bough until they have espied an insect or a fruit. Then they fly off, harvest the booty, and return to their original perch to eat it. Sluggishness is the badge of them all. Of course they are smart enough on the wing, or they could not catch flying insects; but they brood long on the boughs, moping, mum.

THE QUEZAL, THE MOST HONORED BIRD OF MEXICO

One of the most beautiful of all the trogons is the Quezal from the mountains of Mexico and Central America. This bird, hardly larger than a dove, bears marvelous golden green plumes more than three feet long. The bird itself is golden green and scarlet. When the Spanish explorers first visited Mexico they learned that no one was allowed to kill the bird

and that only the chiefs were allowed to wear its feathers.

The Colies, an African group coming next, are distinguished by far greater activity. Their flight, achieved by tremendous beating of wings, seems labored, like that of parrots; but the colies are never averse to an aerial voyage, with excuse or without. They are parrot-like, again, in their manner of creeping about branches and in their habit of hanging head downward, even sleeping, many clustered together, in this quaint position.

THE HUMMING-BIRDS, THE JEWELS OF THE BIRD WORLD

From these lazy birds in fine feathers we turn to the Humming-birds, which display the most intense activity. They are confined to the New World, and South and Central America would deserve the attention of the naturalist if they had nothing else to show than these living jewels. Only a few species are found in the United States, and only one, the Ruby-throat, is seen in Canada. It breeds as far as Labrador. Several other species are seen in California and, of course, in southern Texas.

There are about five hundred species of humming-birds—creatures of many sizes, many designs, many hues. Some are of quite dignified dimensions; others are such marvels of minuteness that, when divested of their feathers, the grown bird is found not to exceed a bee in size.

Some have plain, tiny beaks; some have long, hooked beaks; while some have the bill pointed, straight and sharp as needles. They differ as much with regard to plumage. Nature seems to have tried all her arts in embellishment here. There are humming-birds as sober of coat as our little wrens, but the species rise in such a scale of ascending glory of color and metallic lustre that Nature herself cannot surpass it for loveliness.

THE BEAUTY AND ACTIVITY OF THE TINY HUMMING-BIRDS

The discoverers of the American mainland, when they saw these birds, thought that here were creatures almost divine, perfect in power, in radiant splendor, in food, in life. They thought the humming-birds existed, as the gods of old were reputed to do, on ambrosia and nectar. But though some species sustain life almost entirely on the flower's deep fountain of honey, none rejects an insect, and some species live mainly on this food.

But for this carnivorous habit the little marvels could not range away into the warmer parts of North America and down to forbidding Tierra del Fuego. But whatever their habitat, whatever their diet, humming-birds seem to embody the very poetry of existence, as far as life at the highest pitch of joyous and lovely activity is concerned. Their flight is unique. To say that they swim in the air is too lethargic a simile; everything they do is more like a lightning flash.

They rush into an open flower, drink with their tubular tongues, dart backward, rise like a tiny bolt into the sky; flash upward, sideways, forth and back; drop like a shot toward the ground—all at incredible speed. The eye cannot follow the beat of their rapid wings. The birds flash into sight, disappear and reappear before one has time to form a phrase—fast as thought, swifter than words.

Their song is too excited and high-pitched to be sweet or comprehensible, and their spirits seem to maintain the same exalted level. They are pugnacious also. They fight like little Furies in the air, and when they do not fight they pretend to do so. Their sport, like that of the Vikings of old, is either battle or mimicry of battle.

THE SWIFTS, WHICH ARE COUSINS OF THE HUMMING-BIRD

The Swift, which is a humming-bird cousin, is a bird almost as active. Here we have the wonder of our temperate skies. This bird, from the earliest peep of dawn till the last flicker of light has faded from the sky, flies, darts, wheels and tumbles through the air. It seems that, but for the coming of absolute darkness, he would reveal to us, in his own life, the solution of perpetual motion.

The food of the swift is taken in the air; it drinks by dipping its bill into stream or pond as it flies; it rests only when in the nest during the few short hours of summer darkness. All sorts of estimates of its speed exist, but the flight is so darting, erratic, and difficult to follow that a correct statement is impossible. Yet there is common agreement among close observers that the distance covered by these birds during their hours of flying day by day would, if devoted to a straight course, carry the bird two or three times around the earth in the course of a month.

Where swallows are found swifts may

be expected. We may distinguish the swift by its great sickle-shaped wings, its short tail, its sooty hue, its whitish throat, and, above all, by the shrill, piercing scream uttered from time to time as it flies. The joy of life is manifested by the humming-birds in their sunny forests, but it is also revealed in every motion of a swift as it cleaves the shining air of a summer sky.

A LITTLE BIRD OF THE EAST WHOSE NEST IS EATEN BY MAN

There are about seventy-five species of swifts, and they are common to nearly all lands. They are in Lapland for part of the year, and in Africa; in the Old World and in the New. The Alpine Swift is common throughout mountainous Europe; the Needle-tailed Swift of the East has sometimes drifted into Western Europe, but it is happier in the warmer Orient. There it keeps the company of swifts famous for their extraordinary nests, composed almost entirely of the birds' saliva. All swifts have the salivary glands well developed, and glue their nests to supports, but the nest of the Salangane is almost entirely of saliva. They nest in caves, and the nests are attached to the walls. These are the edible birds' nests of commerce which, with the fins of shark, lend a strange savor to many a Chinese banquet.

Most swifts nest in holes in the thatch of cottages, in belfries, in cliffs and towers; but there are species called Tree Swifts which produce their eggs in the hollow trunks of trees, while one Guatemalan species gathers multitudes of seeds, glues them together and forms a wonderful tube for its nest. In North America the Common Swift builds its nest in the unused chimneys of buildings. We generally, but incorrectly, call it the Chimney Swallow. Three other species of swifts are found in North America, but they are not common.

Our old friend the Nighthawk, or Nightjar, is next in order. He is called by a half dozen other names—Mosquitohawk, Bull-bat, Goatsucker and the like. This bird is seen only in the late evenings as he sallies forth for his nightly hunt, unless we are fortunate enough to find him nesting on the ground or resting, not crosswise, in the common manner, but lengthwise on the bough of a tree. He is entirely an insect-hunter, and his prey is, in the main, night-flying moths. The

great gape of his beak, kept wide open as he wings his way, is in part responsible for the preposterous legend that the nightjar sucks the milk of goats. No nest is built, but the eggs are laid on the ground, on a stump, or even on a flat roof. If disturbed when on the nest, the female will tumble off, pretending to be lame, and attempt to draw the disturber away. The eggs are so nearly the color of the ground that they may escape notice, even when in an open place.

Keeping his ways to secrecy and his journeys to the night, the nightjar has thriven in many lands and branched out into a variety of species of which we have several. A near relative is the Chuck-will's-widow, with a mouth two inches across. Sometimes humming-birds and small sparrows have been found in its stomach, but its chief food is insects. The Whip-poor-will, so called from its mournful note, is smaller. Though often heard, this bird is seldom seen. It breeds from New Brunswick and Manitoba to Virginia, and winters in Central America. Like the nightjar, it builds no nest, but hides its eggs in the leaves or in an old stump. Its habits are also much like those of its larger relative, even to pretending to be unable to fly when the nest is disturbed. The young are able to run when very young and move swiftly on the ground long before they can fly.

From an almost world-wide family we turn next to one which is restricted to a group of islands—the West Indian Todies—quaint little green and red birds which burrow in banks, like sand-martins, but hunt, and live much the life of the flycatchers. Of much wider distribution, yet confined to Central and South America, are the motmots.

A BIRD WITH A MOST PECULIAR TAIL

The Motmots are beautiful tropical American birds about the size of the jay, and show many shades of blue and green in their plumage. They are solitary in habit, and live on small reptiles, insects and fruit. The most peculiar feature is the tail. The middle pair of feathers is no longer than the rest. For an inch or two in the middle the quills are bare so that they are sometimes called racket feathers. For a long time it was thought that the birds bit off the barbs of this middle portion, but it seems that the barbs are weaker in this part and that the

bird breaks them off unintentionally when cleaning its feathers.

The Old World has no motmots, but Bee-eaters instead. These birds do not eat their feathers, but they fill the place occupied by those which we have been studying. To an African savage the bee-eater is a guide to food, for he knows the bird will unerringly locate the home of bees to devour the occupants as they enter or leave their fortress-home. It is particularly fond of the grub and eats them greedily when the storehouse is opened.

The same habit in European and Asian bee-eaters causes these birds to be much disliked where bees are hived by men, for, like the honey-guides, they will swallow the bees of a man-made beehive as readily as the wild bees of the forest. We can only say on the birds' behalf that they devour an enormous number of wasps and other noxious insects, and that bees were their lawful inheritance long before man became an owner of anything but life.

A VISITOR TO BRITAIN FROM THE BURNING DESERT SPACES

Certain peculiarities in the structure of the palate seem to link bee-eaters with the Hoopoes. These are Old World birds which winter in the tropics, but go north in summer. The European Hoopoe winters in Africa, but goes as far north as England in summer. It might breed there, but its colors are so striking that it is soon shot. It is a beauty, mightily crested with black-tipped feathers. The general color is sandy brown to match the desert's dusty face, broken up with black and white to harmonize with shadow and shade.

China, India, Africa, and favored areas throughout the length and breadth of Europe afford the hoopoe a narrowing breeding-ground. It prefers to nest in hollow trees, ash and willow for choice. As explorers have found the birds rearing their young beneath large stones, in crannies in sunny walls and banks as well as in warm caverns, there seems a suggestion that the bird has learned the lesson of disappearing forests. It must change its nesting-sites or die out, even where stupid collectors do not shoot the parent or meanly steal its eggs.

Having said that there is some resemblance between the make-up of hoopoes and bee-eaters, we have now to extend the comparison and find the next link in the Hornbills. The beak of the hoopoe is

neat and graceful, that of the hornbill a sheer monstrosity to human eyes; yet the birds, superficially so unlike, have hidden features in common.

THE PECULIAR BEAKS OF THE BIG FAMILY OF HORNBILLS

Here we have an assembly of birds, scattered over Africa, India, throughout the Malayan area, and away to New Guinea. The family of fifty or more species is distinguished by what seems to us futile absurdity and ugliness. The birds range in size from species five feet long, with a wing span little less, down to examples no bigger than magpies, but all have extraordinary development of the beak. In some it is merely insignificant, but it shades in varying degrees of importance up to sizes which give the bird the name of Rhinoceros Hornbill, Helmet Hornbill, Solid-casqued Hornbill, as well as titles indicative of color and other peculiarities.

It is suggested that the bills of some of these birds are protected by casquets, or helmets, in order that these growths may act as shock-absorbers, that they may even serve as hammers with which to break nuts. But there are beaks which have the helmets open in front as though they were decaying—which they are not; and there are others, great in size, which are almost as light as the cuttlefish bone which we buy for our canaries.

Then the solid-crested hornbill has a helmet so heavy and dense that it is carved and decorated into ornaments in the Far East. These ornaments have a bright yellow interior and scarlet edges, which are the natural colors of the bone of this bird.

HOW MR. HORNBILL SHUTS UP HIS WIFE IN A TREE

Hornbills are all short-legged, save those species which keep to the ground. They eat fruit, insects, reptiles—anything they can find, even carrion. They all have this peculiarity, that the hen, when she is sitting on her eggs, is walled up by the mate, either in a hole in a tree or in a nest formed by converging branches. From the moment the eggs are laid she emerges no more till her chicks are ready to come out and face the world with her.

The male labors to feed her. He collects food and brings it to her prison, tapping at the entrance to call her attention, and feeding her as she thrusts her head out of the little opening left for the pur-

pose. At certain periods he vomits up the lining of his interior organs and gives her that as well. But, with all her feeding, when she creeps out with the family she is a gaunt, miserable spectre.

THE KINGFISHER, ONE OF THE LOVELIEST OF BIRDS

It seems almost an insult to name the lovely Kingfisher in the same breath with the hornbill, but it is that way the relationship lies. The European Kingfisher is one of the loveliest things in feathers. Sapphire, cobalt-blue, green, sable, orange, chestnut, buff, white and coral-pink are blended so well that the result is a thing of beauty.

Like the first song of the nightingale, the first glimpse of a kingfisher skimming like a flash of glory over a sunlit river is an experience to be remembered. The bird deserves his name; he is the sovereign fisher of streams and pools and of all the fresh waters throughout the vast regions he haunts. He is not large—hardly bigger than a sparrow—but his appetite is enormous. He eats insects, worms, crabs and shellfish as well as fish.

He lives near his work, a hole in a bank, the decaying root of a riverside tree. At times, for reasons we cannot divine, the bird will nest farther afield; then, with every fish or water insect that it can spare from its own meal, it must fly to feed the six or eight gaping youngsters hungry on a heap of stinking fishbones and other material on which they are bedded.

The species we know best is the blue Belted Kingfisher, found all over North America. He is considerably larger than the European species, and is less highly colored, but his habits are the same. In Texas is a smaller species, greenish instead of blue.

Our kingfishers will sometimes burrow six feet or more into a bank. The entrance is left large enough for one bird to enter at a time but at the end it is hollowed out to give plenty of room for the nest. The eggs require sixteen days to hatch, and both parents share in the task. The female tries to draw human intruders away by pretending to be wounded, while the male utters violent threats.

Nearly all the world has kingfishers of some sort—fish-eaters, insect-eaters, eaters of reptiles and little mammals. An Australian species, whose harsh cry in the scrub and bush has given it the name

Laughing Jackass, is a kingfisher that lives far from water. In all, there are at least 125 species of kingfishers.

WHAT THE ANCIENTS THOUGHT OF THE KINGFISHER

Ancient poets write of a wonderful bird called the Halcyon, by which they evidently meant the kingfisher. Its nest floated on the sea. Alcyone, daughter of a god, and her husband Ceyx, were transformed into these birds. Her father Æolus, god of the winds, would keep the sea still long enough for the eggs to hatch. So we have the phrase "halcyon days," meaning peaceful and happy. Other superstitions have grown up around the bird. Its dried body will avert thunderbolts. If it is kept in a wardrobe, moths will not touch the clothes. Hung from the ceiling, its bill will point in the direction from which the wind comes.

In coloring and in some details of form the kingfishers resemble the Rollers, an Old World family of some score or more of species of swift-flying green and blue birds, whose flight is rendered eccentric by somersaults or rollings in the air. The Kirumbos of Madagascar seem to be their closest relatives, and lead to the Frogmouths, which link up in turn with the Oil-birds, or Guacharos.

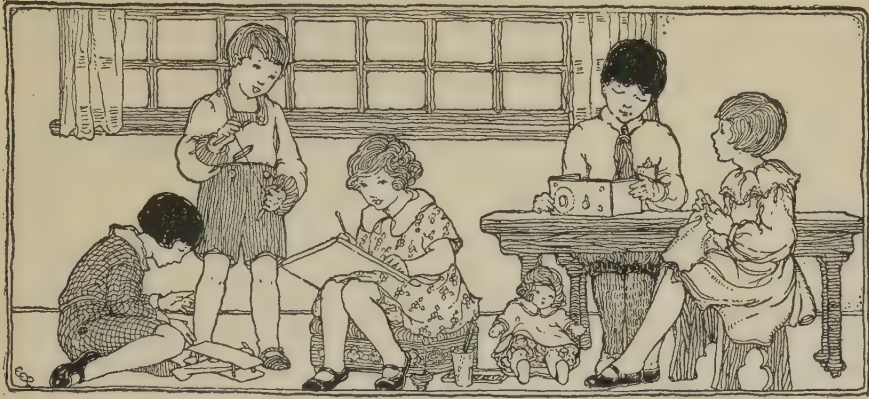
The Frogmouths look like examples of our nighthawks changed by residence in the Australian continent, but they crawl more than they fly. In one branch of the family they have attained a decidedly owl-like outline, and so have been given the name of Owlet Frogmouths.

The Guacharo, better known as the Oil-bird, gets its title from the fact that its young, before feathering, are simply masses of yellow fat which turn to oil with the least persuasion from artificial heat. The fat is used both for cooking and for lighting. The adult bird, like the nightjar and the frogmouth, is a night-flier; noiseless like those, feasting on oily fruits and nuts with which the slender tips of its native trees are crowned. There is only one species which is found in Northern South America and its islands.

The nests of the oil-birds, resembling huge cheeses, are made in dismal caverns. Oil-birds lay from two to four white eggs. The natives enter these gloomy caverns and take the young, while old birds hover around uttering harsh cries. The bird itself is about the size of a crow.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 3497.

THINGS TO MAKE AND THINGS TO DO



A NEW GAME TO PLAY WITH THE ATLAS

GEOGRAPHY is one of those subjects which we have to learn at school, and which may be either very interesting or very uninteresting, according to the method by which we learn it. If we sit down with a geography book and try to learn off a bare list of the twenty largest manufacturing cities in the United States, the subject is very dry indeed; but if we read a bright account of a journey among these cities, with some graphic facts about the things that are made in them, and follow upon a map the course taken in the journey, then we find real pleasure in the lesson, and the names of the places are learned for good.

It is always difficult to remember the outlines of the different countries and islands shown in the atlas, yet we ought to know these shapes at sight. To keep on drawing the maps again and again, in order to fix the outlines in our minds, is dull work; but there is a method of learning the shapes of the countries so that we shall never forget them. It is a game rather than a lesson.

CONTINUED FROM 3254

We take the atlas, and, copying the outlines of certain countries and islands on paper with a lead pencil, we look at them carefully and try to think what familiar objects they are like. Then alongside each country we draw the object which it

resembles, keeping very closely to the outline of the map.

It is astonishing how many of the countries and islands and seas can be turned into pictures of things with which we are all familiar. Italy, for instance, is remarkably like a big riding-boot; New Guinea is like a smiling bird; South America is like a bearded mon-



How the maps are made into pictures.

key; Lake Erie is like a whale; and so on. Having drawn a map of a certain country, and with a few touches changed it into a bird or animal or fish, we shall never forget the general outline of that country.

This game of making picture maps is one that we can play when alone, or it may be used as a round game for a party of any number. Half a dozen countries or islands or seas are mentioned, and their names are taken down by the competitors. Then at-

lases are opened, and the outlines of the countries are drawn by each player on pieces of paper, room being left at the side for the duplicate outline changed into an animal or some other object. When all the maps are drawn, a certain time is allowed for the pictures to be made, and the drawer of the best picture is

then declared the winner, the relative merits of the pictures being decided by the votes of the competitors themselves, unless some older person is present who is willing to act as judge.

A little alteration is permissible, but not so much as would alter the general outline of the map.

HOW TO PREPARE A DAINY TEA

EVERY girl, at one time or another, wants to give a tea-party, and she is anxious, of course, to make that tea-party a success. But not every girl knows how to entertain her friends, even in this simple, delightful way. How should we set about it?

Of course, when we have invited our friends, and the day comes round, it is easy enough to find a confectioner's shop and to order some of the dainty cakes that will surely be on view there. But suppose we wish to be absolutely independent of pastry-cooks and confectioners, or suppose we are miles away from any shops. Be that as it may, we must make up our minds to be our own pastry-cook and confectioner, and make our own cakes.

Is it impossible? Not at all. With due amount of care, and provided that we do not undertake anything too elaborate, we can certainly turn out quite a charming little afternoon tea.

Suppose we arrange our little menu something after this fashion, the quantities, of course, depending entirely upon the number of guests expected:

Green butter sandwiches	Egg and anchovy sandwiches
One large cake	Small chocolate cakes
Small cakes	Almond jumbles
Brown bread and butter	White bread and butter

In cutting bread and butter, which must be our first consideration, we should always have two knives—one to butter with, the other, and the larger, to cut the rounds. And if the butter is hard and difficult to spread, it should be cut in pieces and warmed just to the right degree of softness, but on no account until it becomes liquid.

To make the green butter sandwiches we pick the leaves from the stems of some fresh watercress; then, after drying them in a clean cloth, we chop them small. Now we take 1 ounce of butter, and with a knife mix the two well together, and add a small—very smallest—pinch of cayenne pepper. This green butter should not be made until the day on which it is to be used, and the sandwiches are greatly improved if 4 sardines are skinned, boned and mixed up with it. The mixture is then spread on the bread and made into neat sandwiches carefully cut into uniform size and shape.

To make the egg and anchovy sandwiches we take 2, 3 or 4 eggs, according to the quantity required, and boil them hard. If they are placed in a vessel of cold water, they generally peel more easily than if operated upon as soon as cooked; also, it should be noted, eggs which are a few days old peel more easily than those that are very freshly laid. The yolks are separated from the whites, put into a basin, and well mashed with a fork; a little anchovy paste or sauce is added to them and well mixed. This mixture must be covered until required for use. It should not be made

until the day it is to be eaten. The sandwiches are made, shaped and garnished in the same way as those already described. Sandwiches, and bread and butter too, when cut, should not remain uncovered any considerable time between the making and the eating. If necessary to prepare them some time in advance, the covers of vegetable-dishes may be placed over them, or anything else that will effectually keep the air from drying and hardening them, will answer the same purpose.

We must now prepare the sweeter items—the cakes. Delicious little chocolate cakes may be made by mixing 4 ounces of flour, 4 ounces of sugar, 4 ounces of butter, 1 teaspoon of baking-powder, and 2 eggs. We put all the ingredients together, beating the eggs separately and adding them last. We mix these well and place them in a well-greased baking-tin. The mixture will require from 15 to 20 minutes in a hot oven. When quite cold, we cut it into strips and divide to half the thickness; we spread a thick layer of chocolate mixture on the one half, and place the other half on it very neatly and carefully. The chocolate mixture is made by melting some sticks of chocolate in a little hot water to the consistency of very thick cream. If preferred, the cakes need not be split to half the thickness, but the chocolate can be poured over the top. Where this is done, the enthusiastic young cook may choose further to adorn with some pretty sweets placed upon the chocolate before it sets, or to use a preserved cherry for each strip.

For another dish of small cakes we take the weight of 2 eggs in flour, butter and sugar, and $\frac{1}{4}$ pound of currants, mixing all together thoroughly with 1 teaspoon of baking-powder. If the mixture is scarcely moist enough as it stands, a small quantity of milk may be added. The young cook, however, should be careful on this point, as the tendency is to make cakes a little too moist.

To make the almond jumbles we must beat $\frac{1}{4}$ pound of butter to a cream, then add to it $\frac{1}{4}$ pound of castor sugar. We next mix separately 2 ounces of almonds beaten to a paste with the juice of a lemon, and $\frac{1}{2}$ pound of flour. The whole is then thoroughly stirred together and mixed, made into small cakes and baked for about 15 minutes.

The recipe for the large cake is omitted, as in almost every house there will be some favorite and long-tried recipe. But it may be well to add that the young cook must be very careful in baking her cake: the tin must be thoroughly greased, and for the first 15 minutes after the cake has been placed in the oven it should not be looked at, in order to give it a fair chance to rise before the opening of the door sends a draft of cold air upon it.

It need scarcely be added that everything must be arranged as daintily and prettily as possible, and flowers placed here and there.

THE PILLARS OF SOLOMON

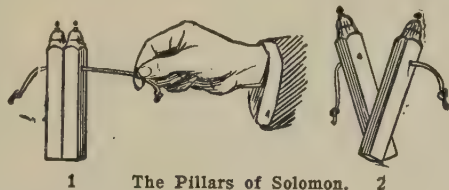
IF the young reader has the good fortune to possess a box of conjuring tricks, we may be pretty sure that one of the items is that known by the imposing title of "The Pillars of Solomon." This consists of two square pieces of mahogany, 4 inches long, laid side by side as shown in picture 1, with a piece of string running backward and forward through a hole near one end of each. There is a knot at each end of the string, and when the cord on either side is pulled, that on the opposite side shortens accordingly. So far, there is nothing surprising. But presently the exhibitor of the trick passes the blade of a knife between the two "pillars." To all appearances the string is thereby cut in halves, and he proves that it is so by moving the pillars slightly apart as in picture 2, and showing the cut ends. And yet, when he brings the pillars back to their original position, one against the other, the string has somehow become one again, and can be pulled backward and forward as freely as ever it was before it was apparently cut.

There is, however, a weak point. The two pillars are pivoted together at the bottom, so that they cannot be separated, and a sharp looker-on soon guesses the secret, which is that the string, instead of passing straight through from side to side as it appears to do, goes down the one pillar and up the other. The supposed cut ends, as shown in picture 2, are mere make-believes, short bits of string artfully glued into the wood.

If the reader has ever been in the East, and visited India, he may have seen the same trick performed by the Indian conjurers, but in a much more surprising way. The "pillars" are in this case two sticks of bamboo. There is here no pretense of cutting the string, but after the conjurer has pulled it backward and forward two or three times with the sticks held side by side, he does the same thing with their outer ends held some inches apart. But the sticks are still held together at the bottom, and some clever person is pretty sure to say to his friends, "I know how that's done! The string goes from the one stick to the other at the bottom; you will see that he can't separate them." And he looks round at the company with a superior smile. But the conjurer smiles too, and holds the sticks wide apart, one in each hand. And yet, when he puts them together again, the string is drawn backward and forward as before. The clever onlooker has to admit that the conjurer has fooled him.

Now, this is really an excellent trick, and it has the additional recommendation that the young conjurer can easily manufacture the needful apparatus for himself. For the

"pillars" he must get a couple of straight pieces of elder about 7 or 8 inches long and $\frac{3}{4}$ inch thick. From these he must push out the pith, as if he were going to make popguns of them. He must then, with a stout brad-awl, make a little hole through one side of each, about 1 inch away from what we will call the upper end. Through each of these holes he must pass a thin cord, and, with the help of a piece of wire bent into a hook, draw it down the stick and out at the opposite end. A tiny weight must now be attached to this end of the cord. An easy way to do this is to roll a bit of tinfoil into a hard ball, about $\frac{1}{2}$ inch in diameter, make a hole through it, pass the cord through the hole, and make a knot on the under-side. A little bit of brass tubing, or a bullet with a hole through it, as sometimes used by fishermen, may be used instead of the tinfoil ball, if more easily obtainable. The test of all is, as it should be, that, if the stick is held upright and the cord



1 The Pillars of Solomon. 2

drawn up as far as it will go, and then released, the weight will draw it gently down again.

Having thus weighted one end of the string, the conjurer must draw up the opposite end as far as it will go, cut off all but 6 inches of it, and make another knot on the free end.

There is no real necessity to close the ends of the stick, but the young conjurer may improve their appearance by pressing a cork into each and finishing off with a little red sealing-wax.

To show the trick, the two sticks must be held horizontally in the left hand, as shown in picture 3. The cord in the stick to the left must be drawn out to its fullest extent, but the weight in the other stick must have been previously allowed to run down to the bottom, drawing down the cord and leaving only the upper knot visible. Now the conjurer must pull out



3. An improvement on the Pillars of Solomon.

slowly the cord on the right, at the same time slightly elevating the upper ends of the two sticks, when the cord in the opposite stick will naturally be shortened, the little weight drawing it down inside. He lowers the sticks again to the horizontal position, passes them into the opposite hand, and proceeds as before, pulling the left-hand cord and letting the right-hand cord retire into the stick.

This is the whole of the secret. To cause either cord to shorten, he has merely to tilt the stick so as to make the little weight within it run down into the stick. To lengthen the other cord he must draw it out with the fingers. But the two movements must be made simultaneously, and it is in the neatness with which they are combined that the magic of the feat consists. If the weight is allowed to drop too quickly, the trick may be guessed.

SAILORS' HITCHES AND SPLICES

ON page 342 we saw how sailors make knots. There are other ways in which sailors must make use of ropes—for instance, in making hitches, which are really a kind of knot, and in splicing ropes; that is, joining

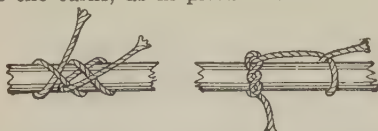


1. The half hitch. 2. The timber hitch. 3. The clove hitch.

two ropes together by uniting their ends without knots. In this article we see how to make hitches and how to splice ropes.

We show the simplest in picture 1. It is called a half hitch. We pass the end round a bar and its own standing part, and then down between its own part and the bar. The next, called the timber hitch, is made in the same way, except that the end is passed not once, but several times round its own part, as seen in picture 2.

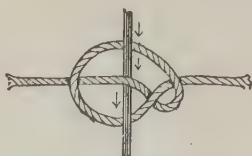
In making the clove hitch, shown in picture 3, we pass the end round the bar, cross it over the standing part, pass it round the bar again, and then pass it between its own part and the bar. The rolling hitch is made in the same way; but the second half of the operation consists in passing the rope twice around the bar, and in passing the end under both the turns, as in picture 4. The timber



4. The rolling hitch. 5. The timber and half hitch.

and half hitch is a combination of two hitches which we have already seen, and is made by making first a half hitch, and then making a timber hitch with the end part, as in picture 5.

Now we come to what is called the handspike hitch. This hitch is frequently used by sailors when the two ends of the rope are fastened, and when they wish to exert pressure upon the rope. We make a loop in the rope first, and then pass the end of the bar through the loop, under the rope, in the loop, and then out through the loop again. It will then be as seen in picture 6. When we pull out the bar again, the rope is free, without any knot or hitch at all.

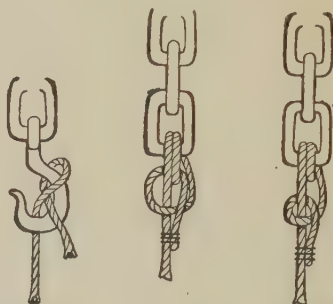


6. The handspike hitch.

The Blackwall hitch, picture 7, which is used on board ship for suspending cargo from the

hook of a crane, is made by passing the end of a rope around the back of the hook and under its own part, taking care that the two parts of the rope are on opposite sides of the hook.

The fisherman's bend is used to fasten a rope to a shackle or ring. To make it, we pass the rope twice round the ring, and put the end through the turns. For security, the end must be tied to the standing part with strong string, an operation that is called "stopping back," as seen in picture 8. The round turn and half hitch is made in the same way, except that the end is passed through only one of the turns, as seen in picture 9.



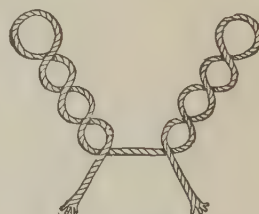
7. A Blackwall hitch.

8. The fisherman's bend.

9. Round turn, half hitch.

The series of loops seen in picture 10 is what is called a catspaw. We take a part of the middle of the rope, and form two bights one of which we take in each hand and twist round an equal number of times, thereby making two loops, one at the end of each of the bights. A bar or spike may now be passed through the two loops.

We now come to the splicing of the ropes. This is more difficult than making knots or



10. A catspaw.

hitches, but it is a very valuable accomplishment, which, if once properly learned, should never be forgotten.

The eye splice is the method of making a permanent loop at the end of a rope. We take the end of the rope and unlay, or open out, the three strands for about 4 inches. Then we place these against the standing part at the spot which will give a loop of the desired size. We take the middle strand, and, after prizing up one of the strands of the standing part, pass the free strand beneath it. We then pass the other two strands, one on each side, under

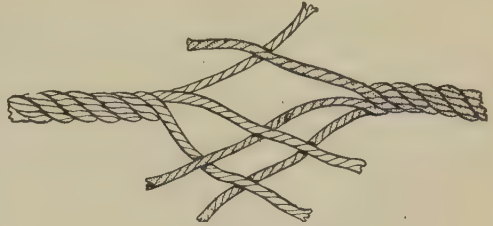
the other strands of the standing part, and work the loop up tight, slightly tapering the strands by pulling off a little of the hemp. The usual practice is to cut one or more of the yarns composing the strands of the rope. After the first tuck has been completed with all strands, we pass them under the strands of the standing part again, taking care that each free strand passes over one of the standing strands before entering beneath the next strand. The ends are now again further tapered, and the process repeated a third time. All ends are now clipped off short after the splice has been well hammered, and then fine spun-yarn is bound round the joint. Binding with spun-yarn, when done the reverse way to the lay of the rope, is called serving. These instructions and the illustration in picture 11, if followed carefully, will enable us to make a good strong eye splice.



11. The eye splice.

To make a splice, or join, between two ropes, the ends of each must be unlaid, or unraveled, for a few inches. Then we fit the ends of each rope accurately together so that the ends of one lie between the ends of the other. This is called crutching, or marrying, the ropes. We now pass each strand over one strand of the opposite rope and tuck it under the next strand. When this has been done once with each strand of each rope, as in picture 12, we taper the ends a little and repeat the process a second time. We finally

clip off the ends, and, if necessary, tie round with spun-yarn. A long splice is used where no increase in the circumference of the rope is required. To begin with, each rope must be unlaid about three times as far as for a short splice. Then the parts are married,



12. Marrying a rope.

as in making a short splice. Now we take one of the strands of the right-hand rope and unlaid it still further, filling up the groove thus made with the corresponding strand of the left-hand rope. This must be done till only a short end of the left-hand strand remains free.

We repeat the operation on the left-hand rope, filling up with the corresponding right-hand strand. We now have two long strands in the middle, and at some distance on each side of them there will be a very long strand and a very short one. We deal with each of these three points separately. We divide the strands at each point and tie the corresponding divisions together; then we take the ends at each point thus formed and tuck them under the second strand, having passed over the first one. We must taper the ends and tuck them a second time over a strand and under the second from it; then we hammer and stretch the rope well, and cut off all loose ends. We ought now to have a rope almost as strong as if there had been no splicing, but as if it had been a rope made solid from the start.

HOW TO BECOME A VENTRILOQUIST

VENTRILOQUISM is not, as many suppose, an art possible only to a few with special gifts; it can be practiced by most people who will follow certain well-defined rules, and persevere till usage brings perfection.

No particular structure of the vocal organs is necessary. A muffled vibration in the cavity of the mouth caused by the action of the tongue and lips produces a kind of whispering in which the words seem to come from a distance. The illusion is helped by means of a doll with a movable head and jaws, to which the attention of the audience is directed away from the face of the ventriloquist.

A well-known performer thus describes his mode of speaking when he wishes to produce the illusion of a voice proceeding from a doll: "I press my tongue against my teeth, and thus circumscribe a cavity between my left cheek and teeth, in which the voice is produced by the air held in reserve in the pharynx. The sounds thus receive a hollow and muffled tone which causes them to appear to come from a distance."

It is essential to have the breath well under control, and not to breathe more than can be avoided. Practice, which should always be carried out in front of a mirror, so that the control of the jaws and mouth may be watched, will produce elasticity in the vocal organs. The voice should never be strained; that is a mistake which many would-be ventriloquists make. The powers must be developed quite naturally or hoarseness will result.

But quite as important as controlling the movements of the mouth is the necessity of misleading the judgment of the listeners. We judge the distance from which a sound comes by experience—that is, by comparing it with other sounds whose distance we know. A ventriloquist will, therefore, mislead the imagination of his hearers by reducing or increasing the loudness of the tones while preserving the same pitch, quality and duration.

Near sounds are generally louder than distant ones, and the skilled ventriloquist will produce a kind of perspective of sounds which will deceive his hearers into thinking they come

from different points. He will indicate directly or indirectly the direction from which he wishes his audience to believe the sound is coming. Here we see the value of learning to manipulate one or two dolls with movable heads and mouths. This needs very great practice, but the audience will instinctively watch the mouth of the doll moving, when it is supposed to be speaking, in exactly the same way as they instinctively watch the lips of a lecturer.

By a gesture the ventriloquist will indicate to the audience the direction from which he wishes them to believe a sound is coming; and this he can do in a variety of ways, as, for example, when he looks or listens in that direction. The audience will unconsciously do the same. Before a sound has been uttered, the listeners are prepared to expect the sounds from that place. All the ventriloquist then has to do is to adjust the loudness of his voice.

It is important for the operator to remember that he must make the sounds not as they should appear at their source, but as they would be heard if traveling from such a distance. The change of pitch and tone, too, adds to the illusion. If the ventriloquist is using a doll which represents a boy or girl, he will give his voice, when supposed to be coming from the doll, a high pitch like a boy's or a girl's. On the other hand, if the doll represents an old man, the operator will make the feigned voice deep and gruff. A lot of fun will be had if the ventriloquist can imitate an Irish brogue or a Scottish burr. Dialects, too, are appreciated.

Very great practice is necessary to carry on a conversation between two or three persons, as, for example, between the ventriloquist and two dolls, and to adjust the voice quickly and readily. In no branch of entertainment is it more true that practice makes perfect.

THE WIZARD'S WAND AND PURSE

AS soon as he aspires to give a regular "show," the young wizard will feel the need of a proper "wand." The young reader may probably have imagined that the conjurer's wand was like the cap and gown of his schoolmaster, merely an item of professional costume. But in truth it is much more than this, and serves several purposes.

Though the spectator may be conscious in his own mind that it is a mere piece of wood like any other, a mystic tap with the wand, for the professed purpose of causing some magical change, goes a long way to make him believe that the change was actually produced thereby. Further, when necessary, the owner is enabled, by grasping the wand, to keep the hand partially closed, and so to conceal some small object therein. If he desires secretly to pick up or lay down any article on his table, the picking-up or laying-down of the wand gives him the opportunity to do so.

The young conjurer should therefore, cultivate from the outset the use of the wand. A handy boy can easily make one for himself. Nicely rounded rods of hard wood, 3 feet long and $\frac{1}{2}$ inch thick, are sold by most hardware merchants for garden and other uses, at five or ten cents apiece. We procure one of these, cut from it a piece about 12 inches long, and cover this with black glazed paper. Over the last 2 inches of each end we paste the same sort of paper, but white or cream in color, and we shall have a wand as good for practical purposes as if it were made of real ebony and ivory.

Having found our wand, we shall, as a general rule, come forward with it in our hand when about to begin a show. But we may now and then produce it in a more magical way. One very effective plan is to produce it from our purse, where we profess to keep it along with our hard-earned pocket-money. Coming forward and making a few introductory remarks, we look about us as if seeking for something. "I am sorry, ladies and gentlemen, but I have mislaid my wand, and till I find it I cannot do anything. Ah! I remember now, I put it in my purse." And we produce it from our purse accordingly.

We have to admit that the last statement is not strictly true; but, however truthful we may be in private life, as a conjurer we have a sort of special license to romance in this way; indeed, when one comes to think of it, a conjurer's whole performance is a sort of fairy tale in action. As a matter of fact, the wand is not yet in the purse, but is hidden in our left sleeve, its outer end resting against the lower joints of the bent second and third fingers. If the first and fourth fingers are left partially extended, the curvature of the other two will appear perfectly natural.

We have two purses, bag-shaped, and alike in appearance, as shown in the picture. One of these is unprepared, but the bottom seam of the other is ripped open for about $1\frac{1}{2}$ inches, making a secret passage into the interior. The inner pocket remains intact, and in this we place a few coins: pennies, dimes or quarters, according to the state of our finances. The other purse is left empty. The two are placed one against the other in the left trouser pocket. We must remember which we place outermost.



To work the trick we place the left hand in the pocket and take out the prepared purse. Transferring it to the right hand, we open it and pour out the coins upon the table. Returning it, still open, to the left hand, and placing the fingers of the right hand inside, we get hold through the opening of the end of the wand, which we then proceed to draw out through the mouth of the purse. If we do this boldly and neatly, standing meanwhile with our left side turned toward the spectators, no one can detect that the wand comes from the sleeve. When the wand is clear we close the purse, put it back into the pocket, and remove the hand. Then, as if bethinking ourselves, we say: "I mustn't forget my money, though." So saying, we thrust our hand into the pocket again, and bringing out the *unprepared* purse, place the coins therein. We must not offer it for inspection, but if any inquisitive person asks to examine it, we may safely let him do so.

This trick surprises people because the conjurer usually does it so unexpectedly.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 3503.

The Book of MEN AND WOMEN



Quaint old pictures from books printed by Caxton.

MEN WHO GAVE US PRINTING

IT will help us to understand this story if we read on page 1053, and the pages that follow, the story of printing as it is done to-day. That story makes us familiar with the terms used and the methods now employed by printers.

It is difficult to think what the lives of the great mass of the people were like in the days when they had nothing to read. They could not have been much better off in things affecting the mind than savages of our own time. A few stories and legends were passed on by word of mouth, but that was the only help the imagination had. People lived in the densest ignorance.

A rich man, we might think, would be proud to be wise and learned. But in those days the rich man was usually very ignorant. So far from being able to read, he considered reading and writing altogether too lowly an occupation for him. There were those who could write, and who could teach him to write, but that would never do for the powerful rich man of those early days. He paid poor monks and clerks to write for him. He would not even sign his name. To sign his name was like putting on his armor—something that he paid a vassal to do for him. Gradually there grew up a demand for knowledge. But there was little to meet the demand. There

CONTINUED FROM 3199



were not as many books in all Europe as one great library possesses to-day.

Each book took perhaps months to make, and the world would have been better without some of the books that did then exist,

for these books simply appealed to the superstitions of men and gave them no new knowledge.

There were some better books, of course. There were a few written copies of books that had been composed by the great writers of Greece and Rome. These were very highly prized by the few who knew of them and loved them. We find that a man wishing to buy a country house near Florence sold his copy of a famous book. The man who bought it sold a piece of land to get the money to pay for it. The longing for books was increasing, but the power to produce them more rapidly did not keep pace with the demand. Thus the need for some brilliant invention to give people books was very urgent when John Gutenberg, the inventor of proper printing, was born, at Mainz, in Germany, about 1400.

It is a curious thing that printing, which records the history, so far as it is known, of every other invention, should tell us so little of its own story. We do not know with whom the idea of printing first began. It is generally

believed that Gutenberg was the first man in history to give the world a book printed with separate pieces of movable type, but the credit of the invention is claimed for other men who lived at the same time as he. We do not even know exactly the year of Gutenberg's birth. The date generally accepted is the year 1410, but it is also stated to have occurred eleven years earlier. We know nothing about his boyhood. His work caused the greatest revolution in the history of knowledge that the world has ever witnessed, yet we are as ignorant of the story of his private life as if he had been an ordinary citizen.

HOW MEN LEARNED TO PRINT PICTURES BEFORE THEY COULD PRINT WORDS

The reason for the confusion as to the actual invention of printing may be a little easier to understand if we take a glance at the attempts at book-making which were being made when Gutenberg was a youth. The idea that there was a better way of producing books than writing them by hand had already entered men's minds. Men had found out the way to print from what we call woodcuts. These were drawings cut into blocks of wood, which, on being inked over, printed a picture on the paper pressed upon them.

That was picture-printing, and it made men familiar with the thought of tracing figures upon paper by means of carved wood, from which many copies could be printed. But that was a long way from printing a book from types which, when one book had been printed, could be used again and again to print other books. The woodcuts gave only pictures; the title was also cut. It took, you can see, a long time to carve a page of words on a block of wood, and it would have been impossible to print many books for which every page of matter needed a separate block of wood. What the printer needed was a number of movable letters that could be put together to form words. Then when the page was printed the letters, or types, could be distributed, and set up again to form other pages. It fell to Gutenberg to invent this wonderful scheme—or that, at any rate, is the decision of many historians.

Rival historians tell a different tale. They say that a man named Lourens Janszoon Coster, of Haarlem, Holland, was the inventor of the movable types,

that he actually printed a book from them; and that his servant stole the types and ran away with them to Gutenberg, whose service he entered and whom he taught to print.

DUTCH CLAIMS THAT COSTER INVENTED MOVABLE TYPES

The story about Coster was not printed until many years after the death of Gutenberg. There is no evidence that Coster made a claim of any sort against Gutenberg, and indeed for many years most people thought that Coster had never existed. On the other hand, in 1499, the story that the first invention of printing was made in Holland was printed at Cologne. It would take too long to tell all the arguments on each side. We can only say that the Germans claim that Gutenberg was the inventor of movable type, while the Dutch make the same claim for Coster.

Let us now take the life-story of Gutenberg as far as we know it. His parents were of noble birth. His father's name was Gensfleisch, but he took the name of Gutenberg in honor of his mother, to carry on the name of her family, for she was the last descendant of her house. She little thought what honor and glory he would bring upon her name. When John was about ten years of age his parents had to flee from Mainz.

There was a great quarrel between the poor and the rich of the city; and his parents, who were among the rich, were forced to fly and take their little boy with them. They settled in Strassburg, and there the inventor of printing grew up.

Some years before he made any attempt to print books, we read of him as being engaged in experiments for polishing stones and making mirrors. He required more money than he was able to secure from his people at home. Therefore he induced a citizen named Andrew Dritzehn to become security for him, so that he could borrow the money elsewhere.

A BUSINESS IN LOOKING-GLASSES THAT FAILED

Dritzehn must have thought highly of Gutenberg, for he entered into partnership with him, the business being the polishing of stones and the making of mirrors. Of course looking-glasses had been made before this, but Gutenberg had found out a way of making better ones than had been known before. The

partners seem to have been successful at first and to have remained in this business for some years. A lucky accident, perhaps, took them out of it. There was to be a pilgrimage to Aix-la-Chapelle, and they had counted on selling a great many mirrors. The pilgrimage was postponed, and the stock remained unsold.

This seems to have put an end to the business. Gutenberg now turned to the work of his life. He took into partnership two men named Andrew Heilmann and Anton Heilmann; his former partner, Dritzehn, also was in the business. It is thought that they began as printers, but probably their first idea was to use woodcuts. The partners must have thought well of the business, for when Dritzehn died, in 1441, his brothers went to law to try to make Gutenberg take them into partnership in the dead man's place. Gutenberg won the day. He neither had to take the brothers into partnership, nor had he to reveal the secrets of his business.

GUTENBERG'S RETURN HOME AFTER HIS LONG EXILE

After this comes a period of mystery. Gutenberg borrowed money for carrying on his experiments, and that is all we know. All his money seems to have gone into his work, for there is a record showing that his wife paid the taxes for his house during this time. Then something seemed to call him to his old home. Perhaps he felt that, as he was about to make known his great art to the world, his native Mainz ought to be its cradle. He returned to Mainz about 1446, after having been an exile more than twenty-five years. He made his home in a house

which formed part of the possessions of his family. We may believe that he had now completed his scheme for the new printing, for we know that he was able to borrow money from a shrewd merchant of Mainz named John Fust. The latter provided two sums of money to enable him to make his "tools" and to purchase other materials. As security Fust had all the printing stock which Gutenberg was to make.

The story is told that they took into

their service a skillful worker in metal named Schoeffer, who was able to assist Gutenberg greatly in carrying out his ideas in the making of the type. Gutenberg is said to have set out to make each letter separately. If he wanted a hundred copies of the letter A, he would set to work to carve a hundred copies of the letter in wood.

But this was too slow; besides, the wooden letters were too soft to

last. The improvement that Schoeffer is said to have suggested was important. He carved the letter on the end of a piece of metal. With this metal letter he punched a mold in a softer metal. Then all that remained to be done was to melt metal and pour it into the mold, and copies of the letter could be made, as fast as the metal would harden. This saved a great deal of work.

The fact that Schoeffer did this for Gutenberg was very important, but does not take any credit from Gutenberg. The first great idea was Gutenberg's; the carrying out of the details owed much to Schoeffer, who was able to supply the additional ideas that Gutenberg needed at the time.



Frederick König.



O. Mergenthaler.



Aldo Manuzio.



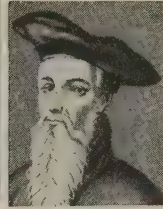
John Gutenberg.



Richard M. Hoe.



William Caxton.



John Fust.

THE FIRST BIBLE GIVEN TO THE WORLD IN PRINTED FORM

And now the work of Gutenberg's life was begun. He had determined to print a copy of the Bible. It took a long time to do it, and the cost was very heavy. The printers had everything to do. They had to make their types; they had to set them up and correct them; then print the pages and set up, correct and print others. There never was enough money for the work. Before the first three pages had been printed 3,000 florins had been spent, and Gutenberg was always haunted by the fear that there would not be nearly enough money to carry out the work.

At last, in 1455 or 1456, the complete Bible in the Latin tongue, bound in two great volumes, was presented to the world. The triumph of printing was at once established. Men agreed that it was "as clear as handwriting," and that, seeing that many copies had been printed at the same time, the cost was far lighter than that of copying by men, while the work was done far more quickly.

THE DISASTER THAT OVERTOOK GUTENBERG IN HIS HOUR OF TRIUMPH

But Gutenberg's sun set as soon as it rose. No sooner had the great Bible been printed than a quarrel arose. Gutenberg and his partner had done a great and splendid thing in giving to the world a noble Bible as the first-fruits of the printing-press. It is something of which printers have ever since been proud, that one of the first books printed by this new process was the greatest and holiest book in the world.

But when that work was ended, strife at once broke out. The wealthy Fust claimed back the money he had lent. He knew that Gutenberg could not pay him, and perhaps that was why he immediately pressed his claim. As he could not have the money, he seized all the printing plant. He was legally entitled to do this, but many things are legal which are very cruel. Poor Gutenberg, in the very hour of his triumph, was turned out of his office. His beloved press was left to Fust and Schoeffer, while he was poorer than he had been when the idea of printing first entered his brain.

However, he was not to die without another effort to further his work. He found a good friend in Dr. Conrad Humery, who enabled him to set up

another press, from which he printed one or two books.

THE SAD ENDING OF A LIFE THAT HELPED TO CHANGE THE WORLD

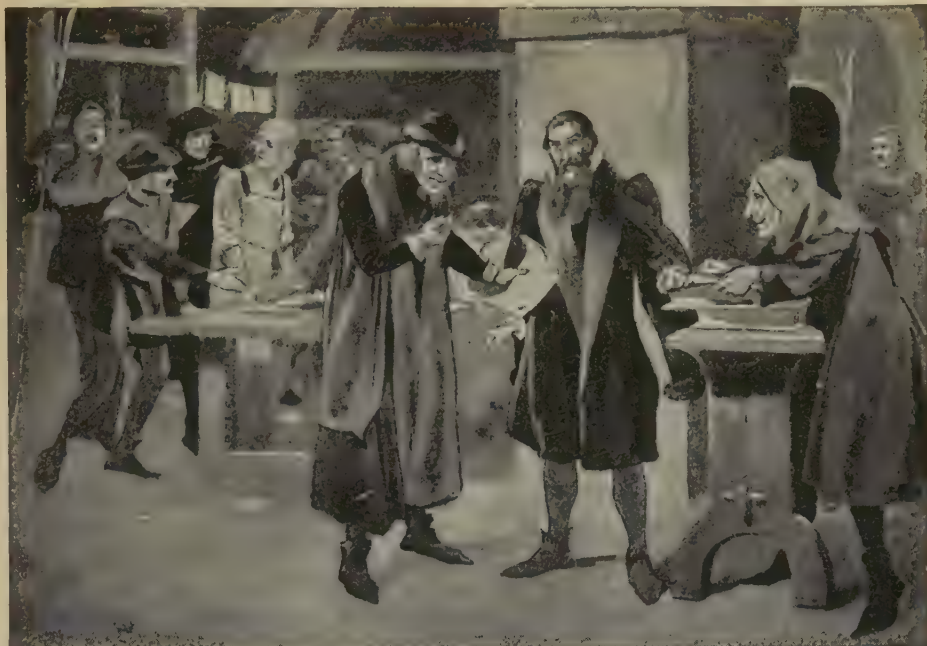
But nothing prospered with Gutenberg after that, and he ended his days as a pensioner, living on the bounty of the Archbishop of Mainz. Nobody noted his death. He passed away in 1468, thirteen years after the completion of the work which made him one of the world's great men. Nearly four centuries afterward the citizens of Mainz erected a statue in his honor. He had no need of it then. His fame had gone forth into all lands. Within sixteen years of the printing of the first Bible the art of printing was being practiced in the principal cities of Germany and Italy. Presses sprang up in Strassburg, Cologne, Rome, Florence, Naples, Bologna and Milan. In England people were too busy with the Wars of the Roses to notice the miracles that were being performed. But for them, too, came the hour and the man.

It was in 1477 that the very first book was printed in England. It was a great time for England, for it marked the dawn of English learning. Remember that until about a hundred years before this time English had hardly been shaped into a written language. After the Norman Conquest, French was taught for reading and writing among the upper classes. Until Chaucer's day, there was little written English, and all documents were written in French or Latin. Now the English people were to have books printed in their mother tongue, and the man who was to do this was William Caxton, whose name is honored in England as much as that of Gutenberg and the other men of his age who all helped forward the great art.

WILLIAM CAXTON, THE MAN WHO CARRIED PRINTING TO ENGLAND

Caxton was born in Kent about 1422, and so was younger than Gutenberg. In these days we should think it strange if parents did not educate their children. It was different in Caxton's days. When he was an old man he used to say that he always felt bound to pray for the soul of his father and mother because they had sent him to school. They little thought, when they put their boy to school, what a great thing they were doing for the education of the whole English-speaking race. After he had

IN THE EARLY DAYS OF PRINTING



There has never been a more important invention than printing. The first man to print a book from movable type is said to have been John Gutenberg, who, at Mainz, about 1455, produced a Bible. A merchant named Fust lent Gutenberg money for his experiments, and when Gutenberg could not pay back, Fust seized his printing-press and type, and turned him out at the moment of triumph.



The art of printing soon spread over Europe, and here we see the printing office of Stradanus at Antwerp, at the beginning of the seventeenth century. Many small printing offices to-day are something like this. The wooden boxes in which the type is kept have not changed at all.

This picture is from a rare engraving in the British Museum.

quitted school they apprenticed him to a wealthy mercer named Large, who afterward became Lord Mayor of London, and thought so well of Caxton that at his death he left the youth a sum of money.

While he was still little more than a boy Caxton went to Bruges, and was soon able to set up in business for himself. At that time several English merchants were engaged in business in Bruges, and Caxton, being an energetic and clever man, prospered. We have evidence of his prosperity in the fact that a few years after his arrival he became security for another merchant for the sum of £100, which would be about \$500 in our money. So far as we know, Caxton went to England on only two occasions during the next thirty years. He made himself master of several languages, and became an ambassador at Bruges for the English king.

THE SACKING OF A CITY SCATTERED PRINTERS THROUGHOUT EUROPE

As we have seen, the knowledge of printing soon spread over Europe. It was largely helped in an unexpected direction. The city of Mainz, where it had begun, was sacked in 1462. The office of Fust and Schoeffer was wrecked, and their workmen were scattered. They spread into various countries and took with them their knowledge of printing. Thus, the misfortune of Fust proved a blessing in disguise to other people. Books multiplied, and printed copies came into the hands of Caxton.

When he was nearly fifty years of age he set to work to translate into English a book on the history of Troy. No doubt he had enjoyed reading it, and wished that people who knew only English should share his enjoyment. When he had made a translation he had it printed. It appeared in Cologne, so far as is known, in 1474, six years after Gutenberg had been laid in his grave. We do not know whether Caxton actually set up the type and printed the book himself or whether he paid someone else to do the work. We do know that he had been much in the company, in Bruges, of a man named Colard Mansion, a famous writer, who had become a printer. But Wynkyn de Worde, Caxton's pupil, claims his master learned the art of printing in Cologne while visiting there in 1471.

THE BOOK THAT CAXTON PRINTED IN A WESTMINSTER ABBEY OFFICE

Whether the book was printed at Bruges or Cologne can never be decided, and it really does not matter. The point of importance for us is that, delighted with the new art of printing that he had mastered, Caxton left for England in 1476 to set up as a printer.

He took an office in premises belonging to Westminster Abbey. It is commonly supposed that he printed actually in the abbey. That, however, is not the case, for his office was in, or near, one of the almshouses which a king had founded. The book translated and printed abroad by Caxton was the first that had ever appeared in the English tongue. The first book ever printed in England was either his book on the game of chess, or one devoted to the sayings of the philosophers. He now had a busy time as a printer. He printed short stories and pamphlets; he printed the works of Chaucer, religious works, the *Morte d'Arthur*, and many others. Nearly a hundred of his books still exist; not all perfect, of course. Parts of some were found to have been used in binding later books; others had been nibbled by rats and carried to their holes in Westminster Abbey. Some of his books sell to-day for more than \$10,000 each.

One of the men who helped Caxton with his printing was Wynkyn de Worde, who went over with him from Belgium, and at Caxton's death, in 1491, succeeded to his printing plant. He carried out the work which his master had begun. He improved the type, and printed more than four hundred books.

THE MEN WHO FOLLOWED CAXTON AND SPREAD PRINTING IN ENGLAND

But before the death of Caxton printing had made a great advance in England. Two years after Caxton's return to England a printing-press was set up at Oxford by Thomas Rood. Two years later one was started at St. Albans by a man called "the schoolmaster." A man named Lettou started for himself in London in the same year. Cambridge waited more than forty years before setting up her first printing-press.

In the meantime the art had spread far and wide over the country. Scotland had her first press in 1507, when two men—Walter Chepman, who found the money, and Andrew Myllar, a bookseller

PRINTING THE FIRST BOOK IN ENGLAND



When we speak of a revolution, we usually think of fighting and bloodshed, but in these pictures, peaceable as the scenes represented are, we see the beginning of one of the greatest revolutions in French history. Nothing has had such an effect upon the progress of the world, or so changed the characters of peoples and nations, as printing, and here we see William Caxton, who introduced printing into England in 1476, reading the first proof from his printing-press in a part of Westminster Abbey.



Caxton set up his printing-press in the Almonry of Westminster Abbey, and there, while the nation was in a state of turmoil, he worked away perfecting his art and producing books. While living at Bruges he had printed one or two books in English, but the first book that is known to have been printed in England is the Dictes and Sayings of the Philosophers, although the earlier Game and Play of the Chess may have been printed there. We see Edward IV and his queen visiting Caxton.

who had been to France and learned how to print—obtained a license from the Scottish king James IV to set up in business as printers. The firm was not carried on after the death of these two men. For some years the Scottish Parliament, when it was having its Acts of Parliament printed, actually had to send to France to get the work done.

The art had now become firmly established in Europe. It spread to our American continent by the help of a Spaniard in Mexico, who in 1544 published the first book ever seen in the western hemisphere. The first English book was published in 1639 or 1640 at Harvard College.

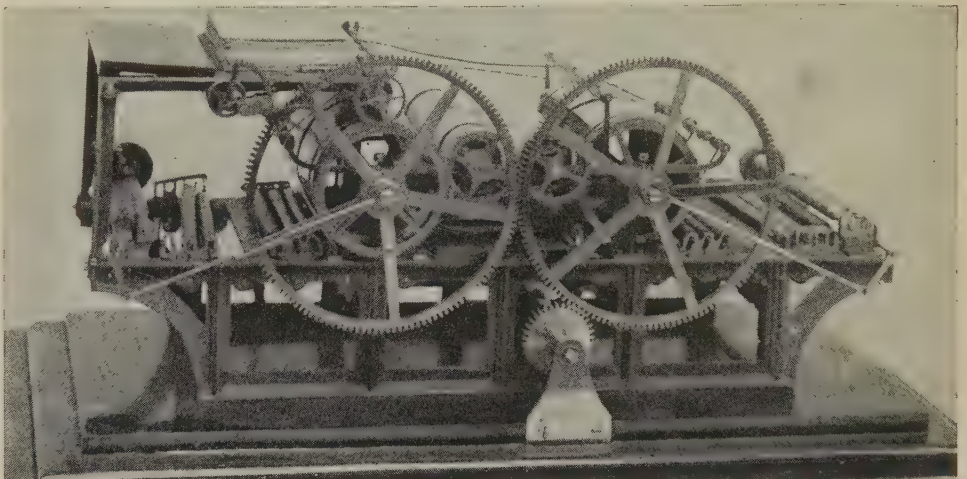
Of course at first printing was not very good. The first improvements in type were made by Wynkyn de Worde,

this type the beautiful handwriting of the great poet Petrarch.

PRINTERS TRY TO MAKE NEW AND BEAUTIFUL TYPE FACES

After Manuzio there were many printers who made type of different designs. Some of these men were true artists at heart. They wanted to produce printed letters that would be beautiful as well as easy to read. If we pick up an old book we do not think the printing is easy to read. The letter *v* was used instead of the letter *u*; the letter *s* was the same as the letter *f*; the spacing between letters was very small. If we compare a page of a book printed in the sixteenth century with the page of the book we are now reading, the difference is very marked.

The old printers did not know what



The first cylinder printing machine, invented by König in 1811, and which three years later printed 1,500 copies of the London Times in an hour.

but the greatest were made by Richard Pynson. He, like Wynkyn de Worde, was a foreigner, whom Caxton had brought over to London. Pynson became printer to the king of England, and performed a most important service to English printing by introducing Roman type, like that which appears on this page.

One of the most famous of Continental printers was Aldo Manuzio, of Venice, who was born in that beautiful city about 1446. With him began the practice of printing, in addition to the ordinary copies of a book, some few copies on especially good paper and in fine bindings. Manuzio was the first to make the type called *italic*, type like that in which the word itself is here printed. It is believed that he took as his model for

was wrong with the type faces they made, but they realized that something better could be produced. In 1574 a London printer, John Day, made a bold roman type that was the best produced up to that date. During the next 150 years the censorship hindered a printing advance in England, and much was imported from Holland. But William Caslon, the greatest of English type-founders, came into public notice. He designed letters that are so clear and beautiful that they are used to this day. Baskerville, Fry, Wilson, Bodoni, Grandjean, Morris, Binmy and Ronaldson are the names of just a few of the men who have helped to make printing a pleasure, not a task, to read. If we notice the different kinds of type in the papers and

books we read we shall understand that men are still thinking how to make type that the eyes will read with ease.

THE GOVERNMENT TRIED TO KEEP KNOWLEDGE FROM THE PEOPLE

As printed books appeared in England, education became better and more common, so that many people were able to read and discuss the events printed in books and pamphlets. This alarmed the Government, and in 1530 what is known as a press censorship was established. If a man printed anything not approved by the censor he was cruelly punished. This state of things lasted more than 150 years, and the lot of the printer was so hard that printing became almost a lost art again. Men would not risk imprisonment and fines to publish works which the people wanted but which the tyrannical censor might condemn. Even before the appointment of a censor, books had been seized and burned by the Church. Not until 1694 was the office of censor swept away.

When the censor ceased to be, men plucked up hope again, and printing soon began to improve. Better type was made, but still the printing machinery continued to be pretty much what it had been from the first.

In these old hand presses, the type was set and fastened, or "locked," on a flat heavy "bed." The type was carefully inked over by the use of stuffed leather balls which were made for the purpose of spreading the ink. A sheet of paper was laid on the locked type. The heavy bed of the machine was pushed under the press, which was screwed down by hand until it was tight enough to cause the paper to receive an impression from the inked surface of the types. The same laborious process had to be gone through for each sheet and for each side of the sheet. So we cannot wonder that books were scarce and dear and newspapers few in number.

IMPROVEMENTS MADE IN PRESSES IN THE EIGHTEENTH CENTURY

Just before the time of the French Revolution a Frenchman named Pierre made an iron press which was much better than the old wooden ones. It was brought to England, and there the Earl of Stanhope, who was of a mechanical turn of mind, invented many improvements on it. By the use of these devices it became possible to run the type under

the press more easily and to screw the press down more quickly. Improvements were made in the Stanhope Press during the early nineteenth century, and some of these old hand presses are still used for very fine hand-printed books. The best of them need two men to work them, and at their greatest rate of speed, between only two and three hundred pages can be printed in an hour.

As our great newspapers print a large edition inside of an hour, you can see that many inventions have been made since that time. The favorite hand presses in the United States in use were the Columbian Press and the Washington Press. Some of the old books that you may see in libraries or on your grandfather's bookshelves were printed on them. Many small presses that are now used for what is called "job printing" are the same presses improved by the addition of a treadle, something like the treadle of a sewing machine, so that they can be run by foot. In large printing offices these presses are run by an engine of some sort or by an electric motor. The best of them had improvements made by George P. Gordon, of New York, and leaflets, programmes, school magazines and so on are generally printed on the Gordon Press.

THE MEN WHO INVENTED MODERN NEWSPAPER PRESSES

As newspapers grew in size and circulation the old presses were found to be too slow. William Nicholson, of London, in 1790 got an idea that the paper might be fastened to a cylinder which could be rolled over the type. He also thought that the type might be fastened to a cylinder. He was not a printer, but an author and an editor, and he could not make the machine work. Frederick König, a German printer living in London, took up one of these ideas and persuaded the London Times to try it. In 1814 two presses were completed for that newspaper. The types were placed on a flat bed which rolled under a cylinder. The press was worked by steam power and could not print over a thousand copies an hour on one side of the paper. Improvements were made in this press also, and presses of very much the same kind are often used now to print books.

Next came the Hoe Type Revolving Machine, on which the type was fastened to a revolving cylinder which touched other cylinders round which the paper

was drawn. With this press 8,000 copies could be printed every hour, and soon an improvement was made and 20,000 could be printed. Up to this time no newspaper had a very large circulation, for it could not print many papers in a day. This invention made possible the newspaper of to-day.

The next improvement was made by William Bullock, of Philadelphia, who invented a press with cylinders which cut the sheets from a continuous roll of paper and printed them. After that came the invention by which type for each day is made in the form of a cylinder in the way that has been described in the story told on page 1053.

Since that time further improvements have been made in the Hoe Press, and a press has been built which will print, cut and fold 300,000 copies of an eight-page newspaper in an hour. It is a wonderful thing to watch these presses at work. When the time to print the newspaper arrives, the cylinders are fastened in their places, the ends of the great rolls of paper are led into the guides that feed them to the cylinders over which they are to travel, the great press is set in motion, and in a few minutes the newsboys are crying their wares on the street. These huge presses are built in tiers, and the men who tend them have to mount ladders to reach the top. The presses not only print the newspapers on both sides of the paper at once, but cut the paper, and fold the sheets.

BOOKS ARE PRINTED ON SMALLER PRESSES

These presses, however, are much too large for the printing of books, and work much too rapidly to do beautiful printing. Therefore books are printed on smaller presses, such as you may see in the story of *The Wonder of a Book*.

Printing ink is not, of course, the kind of ink that you use in your ink bottles, nor is it, as one little girl thought, applied to the paper through something like a typewriter ribbon. The ink used is a mixture which is composed chiefly of boiled oil, the black soot left by smoke, and some sort of coloring. This ink is spread on the face of an elastic cylinder which is rolled over the surface of the type, either by hand, in the case of a hand press, or by machinery. The ink rollers are made of glue, glucose, glycerine and sugar, and feel in the hand like a

very elastic ball. This elasticity enables them to spread the ink very smoothly and evenly, and so there are no blurs on the beautiful pages of our books.

The London Times steam press was the biggest advance in printing made since the day of Gutenberg himself. Since then new inventions for printing have followed each other with great rapidity. Among these inventions is one that is called *electrotyping*. A sheet of wax is pressed down on an engraving or on type faces, and an exact copy is transferred to the sheet. By means of an electric current a shell of copper is laid on the wax sheet, and of course this shell takes the lines and type faces of the original engraving or type. This shell is mounted on type metal and from it prints can be made. Many shells can be made from the one sheet of wax. *Electrotyping* is thus a great labor-saver. Printing colored pictures has become one of the most wonderful of the printer's triumphs. For the setting of type, machines have been made which seem to do all but think, while the great machines that print the papers and books of the present day are among the most marvelous contrivances ever invented by the genius of man.

Clerk Maxwell was the first man to suggest that pictures might be printed in colors. The idea was taken up, and experiments were made by several men. The first man that devised blocks from which the printing could be done was Frederic Eugene Ives, who was born at Litchfield, Connecticut, in 1856. When he left the public schools, where he received his education, he learned photography as an occupation. The scientific side of his work was of most interest to him, and when he was only eighteen we find him in charge of the photographic laboratory at Cornell University, where he stayed three years. He it was who invented the process by which all the thousands of pictures in this book are printed, whether they are black and white or are printed in colors. The latest advance in picture-printing has been made by a number of electrical engineers. It is the sending of photographs or line drawings over a telegraph wire or by radio. It is marvelous that a picture taken at one spot can be reproduced a thousand miles away in a few minutes. At present this discovery is in its infancy.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 3487.



An American river blocked by floating carpets of water-hyacinth.

WEEDS THAT CREEP OVER THE EARTH

EVERY gardener and every farmer knows that the world is full of weeds. In fact, the greater part of the work of the farmer and gardener is the destruction of weeds, so that they may not draw from the soil the water and the nourishing elements needed by cultivated crops.

But what is a weed? There have been many definitions, but we may sum them all up by saying that a weed is a plant growing where it is not wanted by man. Therefore it follows that what may be a useful plant in one situation may become a troublesome, even a dangerous, weed in another place. No plant is necessarily a weed, and there is no plant that in certain circumstances could not be a weed.

A man wishing to grow strawberry plants would find potatoes and turnips and wallflowers, which hampered or choked his strawberries, mere weeds. It is all a question of situation. A beautiful flower, the water-hyacinth, grown in European gardens, becomes a pestilential weed when it chokes an American river and stops navigation, involving the expenditure of hundreds of thousands of dollars in its removal from the waterway.

There are many ways in which weeds

CONTINUED FROM 3268



prove injurious to cultivated crops. As already indicated, they take from the soil much of its water and nourishment, and thus deprive the crops of their food. In this way they are sheer brigands and robbers. But they also deprive the cultivated plant by shutting off the supply of air and heat and light, particularly in the case of slow-growing crops like carrots and turnips; and they reduce the yield of a crop by occupying ground that should belong to the crop. Then, certain weeds, like the bindweed, wind round the cultivated plants, pressing their leaves closely to their stems, and thus preventing the full development of the crop. Weak-stemmed plants, like the cereals, are often pulled down to the ground by the weight of the climbing weed. In this way the weeds are relentless enemies, destroying without mercy and without quarter.

There is another way in which weeds do immense harm to the crops of man. They encourage and foster the growth of insect pests, as in the case of the field-mustard, or charlock, which harbors the turnip-fly, and the turnip gall weevil. This they do by supplying nourishment and shelter to the insects before the crop that they attack comes up. This enables the pest to live and

multiply in readiness for the attack on the cultivated plants when their tender, unprotected shoots venture out above the soil.

Weeds also do harm by injuring the grazing animals or their products. For example, wild onion spoils the flavor of the milk of cows which have eaten it. Finally, in spite of all the hoeing and care of the farmer, a certain number of weeds are sure to grow up with the crop and be harvested with it. The presence of weed seeds among the cereals, after threshing, greatly reduces the value of the food crop both from the nutritive and from the commercial point of view.

HOW WEEDS FIGHT AGAINST MAN AND KEEP DOWN FOOD SUPPLIES

Many wild plants, indeed, have become the companions of cultivated plants simply because their seeds cannot be separated readily by the machines used for cleaning seed. The corn-cockle is a familiar example. It lives with the wheat because its seeds are about the same diameter as the wheat and pass through the screens with them. Many weeds of the lawn and meadow have seeds which cannot be separated easily from the grass seeds which alone are wanted.

In all these various ways the weeds are fighting against man and keeping down his food supplies. It has been said that the weeds of the earth are one of the most formidable agents ever established for man's overthrow. It is only as he conquers them that he rises. Man, in the physical sense, is but a weakling, and when he lets nature in the fullness of her powers overtake him, he is well-nigh at her mercy.

"The weeds of the earth," says an agricultural writer, "vagabonds that they sometimes seem, outlaws and outcasts, have a power not to be looked upon lightly. Their onslaughts are not matters of centuries or decades but of seasons, even of months or weeks. By some sinister provision they are marvelously fecund. Under drought and neglect they thrive. When man ignores them they rise to the height of their powers."

WEEDS THAT SERVE A GOOD PURPOSE AND ARE USEFUL

But in spite of all this it must not be taken for granted that weeds are only harmful. In newer countries, like Canada, they often help the farmer to understand the nature and possibilities of his

soil. Even in European countries some of them, at any rate, serve a useful purpose. When the cultivated crop has been harvested, the weeds that spring up often help to retain in the soil the nitrogen which would otherwise be washed out by the rain. When they are plowed under, the nitrogen again becomes available as plant food for fresh cultivated crops.

But, beyond these uses, weeds have a moral influence on man. "The part they have played, all unintentionally, in the development of man's own self-reliance," says one writer, "is not small. As no gain worth the having ever comes without a struggle, so no step forward on the part of man in his development of the earth can be made without meeting and vanquishing these bitter foes, thus adding measurably to his own strength." By keeping the farmer alert and compelling him to clean his ground they insure that proper care shall be given to the cultivation of the crops. Good and thorough weeding pays, for it has been shown that clean fields yield from forty to fifty per cent more crops than unweeded areas.

THE ENEMY THAT CREEPS ABOUT THE FARM OUT OF SIGHT

While any plant growing out of place may be described as a weed, there are differences. Weeds have been divided into two classes: the relative weeds, as they are called, which are cultivated plants out of place; and the absolute weeds, which are plants that possess no value for the farmer and are injurious to his crops. Among these last may be mentioned the various thistles, that great pest the bindweed, the docks, and the familiar and beautiful red poppy of Europe.

Many weeds are very hard to get rid of because of their long roots. These go down deep and draw moisture and nourishment from the soil in dry seasons when the cultivated crops languish. They are perennials—that is, plants that go on living for more than two years—and some of them are among the most difficult weeds to deal with. They throw off seeds to continue their race, and also, by means of underground stems, they creep about out of sight, burrowing rapidly through the soil. Each year they send up into the air leafy stems which manufacture the necessary plant food for the production of flowers and seeds.

The bindweed, an immigrant from Europe, is an example of this persistent and

noxious type of weed. Once it has obtained a firm hold, it is almost impossible to exterminate it. Though the visible plant may be destroyed and the roots dug up, the underground stems are so deep down that some fragment is certain to be left behind, and this has the power of growing and founding a new colony.

The habit of any weed has a marked effect on its distribution. Those that spread only by means of seeds are generally found scattered here and there as individual plants. Those that have the

Annual weeds thrive in cultivated fields which bear annual crops like wheat and barley, because perennials are at a disadvantage, owing to the constant plowing-up of the soil. The seeds of the annuals fall into the soil and remain there unnoticed and unharmed till the season comes for growing up. But annuals cannot compete with perennials on equal terms. If a piece of ground is cleared, or a field allowed to remain uncultivated, in the first year annual weeds will appear, such as charlock, chickweed, mayweed, red



The lake in Battersea Park covered with the American pondweed.

creeping habit are found in compact colonies. This addition of an underground system of attack to the robber equipment of the weed makes it a very formidable foe.

Most of the weeds of cultivated soil, however, are annuals—plants that grow, blossom, produce seed, and die in one season; and these are supposed to have come from ancestors which, in order to escape competition with perennials, grew on rocks and poor soil, and then, owing to their rapid growth and seed-production, invaded the fields cultivated by early man.

dead-nettle, shepherd's purse, scarlet pimpernel and so on. But in the second year perennials will begin to squeeze out the annuals. Among them will be the nettles, docks, plantains, thistles, hawkweeds and so on. By the third year the ground will be largely occupied by perennial weeds, and most of the annuals will have disappeared.

Many weeds produce enormous numbers of seeds, and these are dispersed by the wind or in some other of the many ways described in the part of this book that begins on page 1083. Flixweed, common in Europe, is a near relative of the

common hedge-mustard and a member of the cabbage family. It is said to produce 730,000 seeds in a single season; and if all these became plants and grew to maturity, flixweed would in three years cover a surface two thousand times as great as all the dry land of the world. Even henbane, which produces only ten thousand seeds a year, would at the end of five years, if all the seeds germinated, cover the whole land surface of the globe.

WHY THE MULTITUDE OF PLANTS DOES NOT OVERRUN THE EARTH

A variety of causes prevents the unlimited spread of any such plants. The seas present a formidable barrier to their passage. The competition among the weeds themselves keeps down the numbers. Extreme heat and cold have some influence. Man, with his many modern scientific methods of fighting weeds, is able to keep them from taking possession of the land. It is far easier to fight weeds than to combat insect pests, though in some ways the fight is similar. Nevertheless, it is astonishing how plants of one kind and another will appear, as from nowhere, and cover any piece of ground not under cultivation.

Some years ago a large area was cleared in the Strand, London, and left untended. Within twelve months over a hundred different weeds were found on it, and what had been bare ground was completely covered with a mantle of green. The seeds had no doubt been blown there or dropped by birds. The walls of the Colosseum, in Rome, which might be thought to present little opportunity for the spread of weeds, were found some years ago by a British botanist to have growing upon them no fewer than 420 different kinds of plants. A whole volume was needed for their enumeration.

Of course, men carry weeds from land to land in a variety of ways. Some seeds go mixed with the seeds of cultivated plants. Others are carried in the ballast of vessels. Some travel across the world in the soil attached to spades and shoes of agricultural emigrants.

WHY WEEDS CAN EXIST ONLY WHERE MAN LIVES AND WORKS

The question of weeds and how they can be kept in check has been described by a well-known authority as one of the most important problems to be faced by the farmer and gardener. Agriculture is an eternal war against weeds, and the

history of weeds is the history of agriculture, for, ever since the people of the Stone Age first began to till the ground, weeds and crops have gone hand in hand, and man's movements, his war and his trade have all played their part in assisting the spread of his enemies the weeds. Weeds exist where men live, for when there were no men there were no weeds. It is only when man displaces the native plants of an area, and substitutes for them those which he desires to grow, that the struggle begins. The native plants are always striving to gain their old ascendancy, and man tries to keep them out.

The intensity of the struggle may be gathered from some facts set forth by Harold C. Long, a leading authority on weeds. In a good garden soil which had been well cultivated for at least three years few weeds had been allowed to shed their seed. He measured off one square yard and removed all the seedling weeds by hand. Here are the numbers of different weeds that were found: buttercup, 654; annual meadow grass, 107; dock, 60; goosefoot, 26; groundsel, 25; various others, 178—making a total of 1,050 weeds. Another authority found in a square metre of ground, that is, a square yard and a fifth, 33,574 seeds of weeds.

A WORLD IN WHICH THERE IS NO ROOM FOR WEEDS

It is clear, therefore, that the soil is a vast storehouse of seeds preserved from generation to generation, from which weeds can grow and multiply whenever they get the chance. Some of these seeds have astonishing vitality. Those of the shepherd's purse, for instance, are capable of germinating after fifteen years or more. The seeds of charlock may be buried deep in the soil for many years, yet they will germinate when brought to the surface.

Since long before the time when Solomon went by the field of the slothful and saw it all grown over with thorns and nettles, man has been combating the weeds, first with spade and hoe and then with agricultural machinery. But the effort, till comparatively recent days, has been individual, and only partially successful. Individual effort has now in many lands been supplemented by legislative action; and the laws of several countries say that a farmer who does not join in the great war against the weeds shall be punished.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 3519.

ONE HUNDRED PLANTS THAT GREW IN THE STRAND



This site was cleared in central London by the removal of houses. The bare ground was covered within a year by a thick mantle of vegetation, which included over a hundred different species of plants. The seeds were planted by birds and wind.

THRIFTY THICKETS OF WEEDS



This does not look like a lettuce garden, but if you know how garden lettuce looks when it has gone to seed, you see that these plants are its cousins. One name for them is Wild Lettuce, another is Horseweed. From Georgia to Arkansas, and northward to Canada, the weed grows along the wayside, tossing up its small creamy flowers in loose clusters.



This common and troublesome weed, trying here to push into a cornfield, has a beautiful and elegant family name—Ambrosia—which means “food for the gods”; but you probably know it better as Ragweed. Its flowers are small and green.

Photos, L. W. Brownell.

